POPULAR PHOTOGRAPHY

HOW TO MAKE GREAT PICTURES

3 GREAT WAYS TO LIGHT PORTRAITS

HOW PRO SHOOTERS DO IT P.49

FULL FRAME FOR LESS!

Canon EOS 6D

Outstanding low-light ability, super resolution, Wi-Fi capability, and more—at a sweet price. So what gives?

Lab & field tests reveal all. P.63

MAKE MONEY NOW!

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SONY CYBER-SHOT RX1

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MENTOR SERIES®

Ultimate Photo Adventure

© Xavier Arnau

SCOTLAND

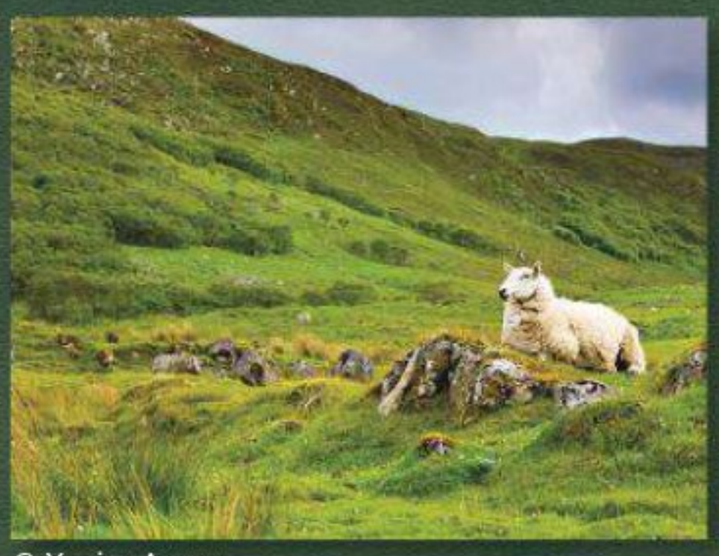
August 1-10, 2013

Join the Mentor Series this summer in a land consisting of majestic seascapes, diverse cultural heritage, and vibrant beauty. Nikon professional photographers Dave Black and Bill Durrence will guide you as you embark on this scenic photographic journey of Scotland, which promises much more than memories of vivid rolling hills, secluded coastal towns, and lush highlands.

We will start our adventure in **Edinburgh**, and continue on to the dramatic coastline to capture images of quaint fishing villages and breathtaking vistas. We will head into the heart of the **Highlands** where vibrant colors of the surrounding hills, forests, and haunting castle ruins await your lens. Enjoy the opportunity to learn how to best capture Scottish bagpipers with a classic backdrop as these top Nikon pros assist you in mastering your craft.

A trip to Scotland wouldn't be complete without considering the role the time-honored Whisky tradition plays and we will do so with a private tour of the **Glenfiddich Distillery**. Here we will get a unique opportunity to get an up-close perspective of the process from mash to bottle with top distillers. Your mentors will continue to make sure your photos adequately tell your story as we witness the rich whisky-making experience at this picturesque distillery, which holds the honor for producing the world's most-awarded single malt.

A jaunt to the **Isle of Skye** will afford us the opportunity to admire the velvet moors, view the sparkling lochs, and capture the impressive jagged mountains and towering sea cliffs often iconic of this beautiful country. A Mentor Series Trek to Scotland will enchant, inspire, and change the way you approach photography for years to come.



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Please Recycle This Magazine

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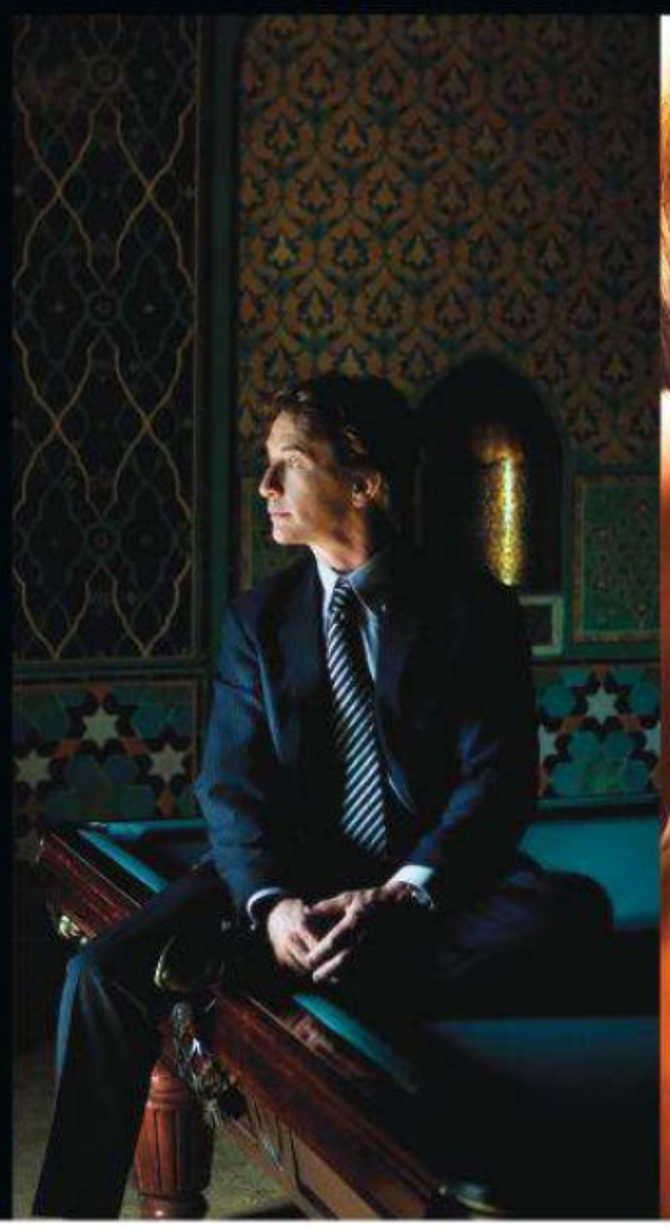
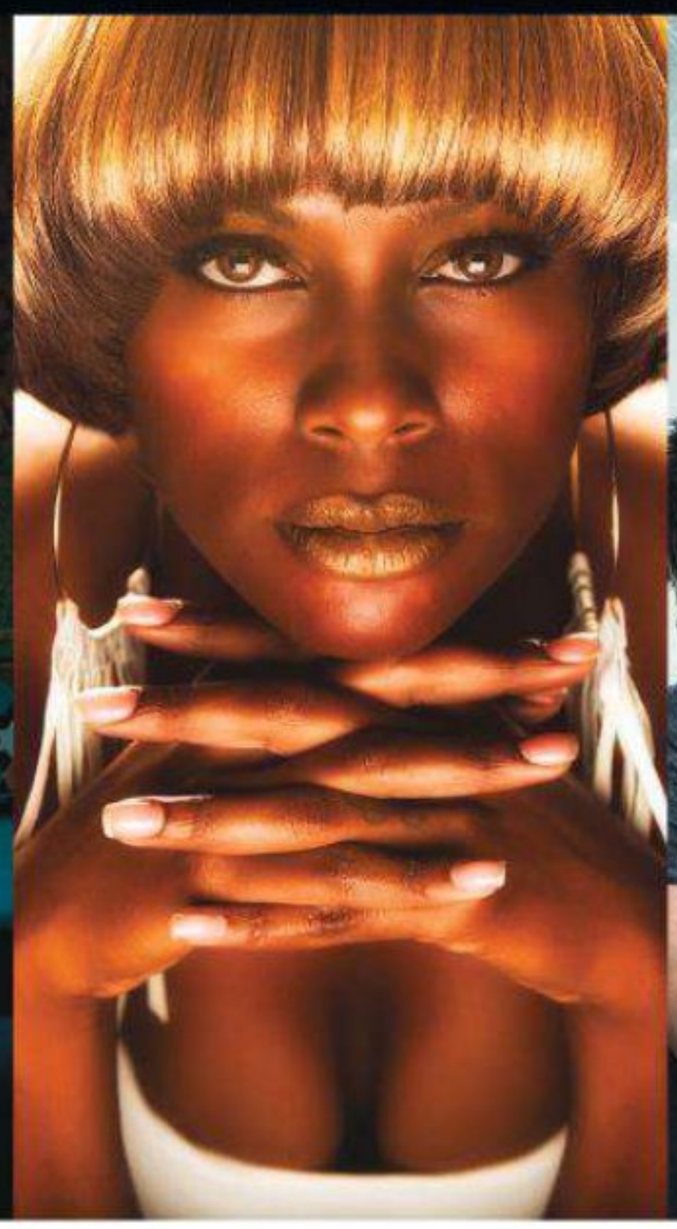
Learning to shoot portraits starts with mastering the uses of a single key light and builds from there. We ask three top portraitists how, when, and why they choose one-, two-, or three-light setups for winning portraits, from simple to complex.

By Peter Kolonia





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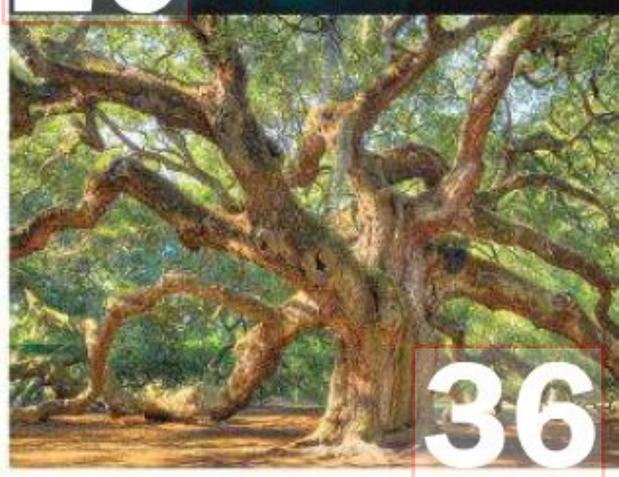

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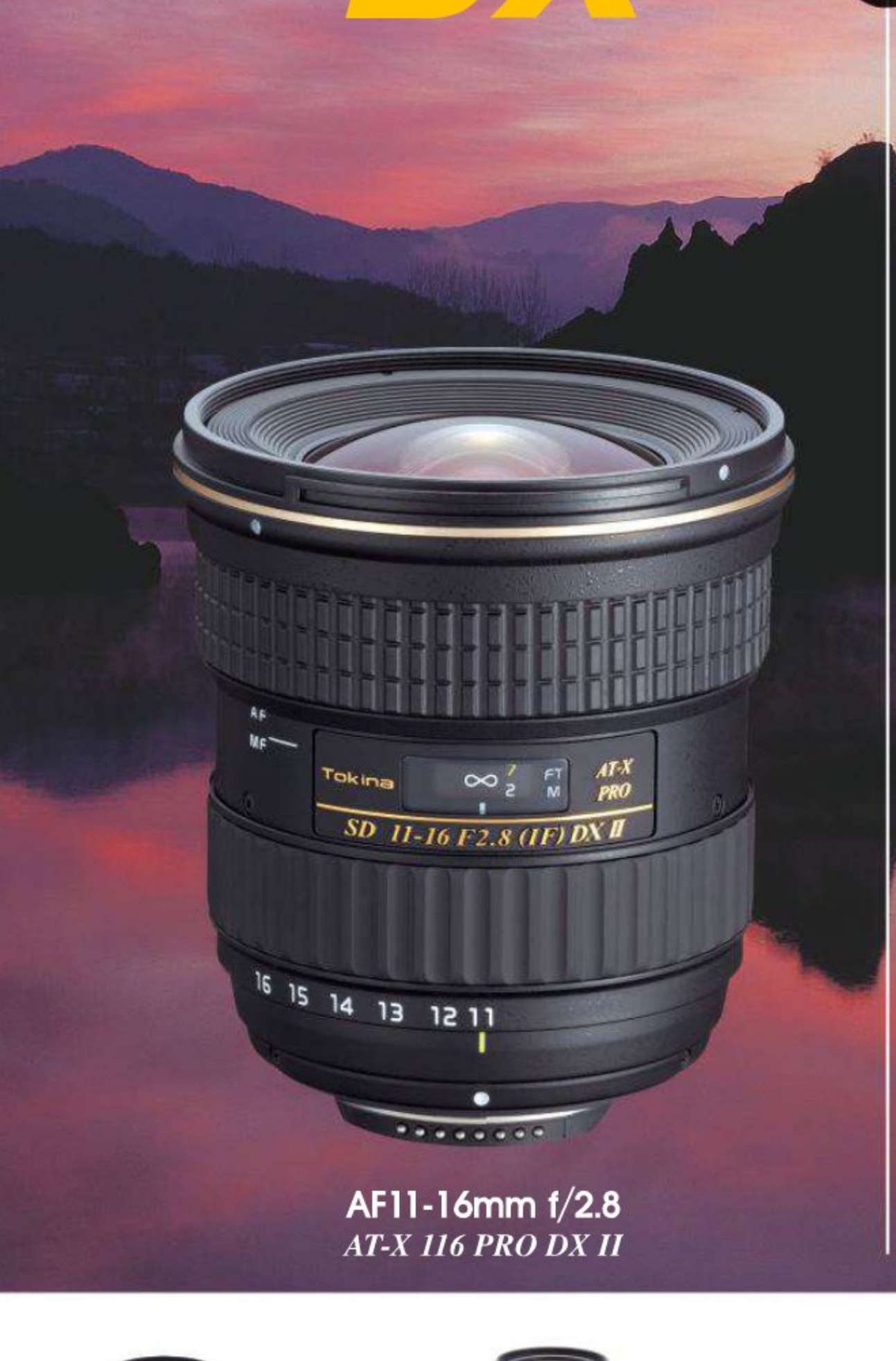

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Going Gaga Over TVs

I never thought I'd fall in love—with a television. But there I stood, in the middle of the overwhelming gadget-fest known as 2013 International CES, staring agape into a giant screen. Not just any screen, but a 4K OLED, incredibly thin and measuring 56 inches on the diagonal, with a picture resolution more than twice as fine as Full HD. Video footage from Carnival in Rio de Janeiro rendered colors (including metallics and deep blacks) perfectly and revealed a wealth of crisp detail from the highlights to the shadows. This prototype from Sony produced the most gorgeous TV image I have ever seen.

In another part of the Las Vegas Convention Center, Panasonic showed its own stunning 4K OLED television, plus a 20-inch 4K LCD tablet that, while not exactly portable, made me want to sneak it home in my too-small bag (read more about it in The Lowdown, page 14). LG exhibited a big 4K OLED, too, and so did Samsung. By the time I saw Samsung's 85-inch 4K television in an easel frame—not an OLED, but nobody's perfect—I was ready to trade my apartment for one with much bigger walls.

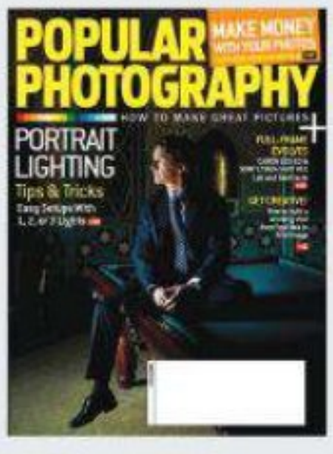
Why am I going on about a bunch of insanely expensive televisions that haven't yet arrived in stores? Because at last I have seen a glowing screen truly able to display a photograph as well as—if not better than—a print of the same size. And that size is huge.

First, you need to consider the resolution. The designation "4K" refers to pixel resolution close to 4000 pixels on the horizontal (I'm being vague because 4K television, cinema, and file-storage standards each differ slightly). A high-res computer monitor measures at least 1600 pixels across, Full HD video 1920 pixels, and the Retina screen on Apple's new 15-inch MacBook Pro is 2880.

And while consumer electronics mavens complain that there's almost no packaged content (i.e., movies or TV programming) available in 4K, you have plenty of it sitting in your computer and on the memory card in your camera. A huge glowing screen will never be the best way to look at your snapshots, but just wait until you see your favorite landscapes, travel photos, wildlife portraits, detailed street scenes, and artistic images—especially color work—at this size and clarity. Add to that the superior color rendition and dynamic range afforded by OLED technology, and we may finally have a screen that does justice to all the megapixels we're capturing today. I may finally stop missing Cibachrome.

Still, there's love and there's foresight. By the time the price of 4K OLEDs come down to earth, 8K will be ready. And I'm still dreaming of owning roll-up AMOLED screens in two sizes, one as wide as my living room and the other as big as a broadsheet newspaper. Another five years and I'll be ready to commit.

Miriam Leuchter



NEWSSTAND Canon's EOS 6D, tested on page 63, brings full frame into reach, with very few compromises in image quality and performance. Photo by Satoshi.

SUBSCRIBER Jason Madera captured Martin Short using windowlight and a reflector. See how to get great portraits with one, two, or three lights, page 49.

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PHILIP RYAN

STALKING LIGHT

In the moments following an afternoon rain shower, Technical Editor Philip Ryan captured this image, highlighting both the resolution of Sony's Cyber-shot RX1 and the creamy *bokeh* of its fast 35mm f/2 lens. His exposure: 1/100 sec at f/4, ISO 100. He used Adobe Camera Raw to make minor adjustments to the JPEG produced by the camera. For our full lab and field test of this full-frame compact camera, see page 66.

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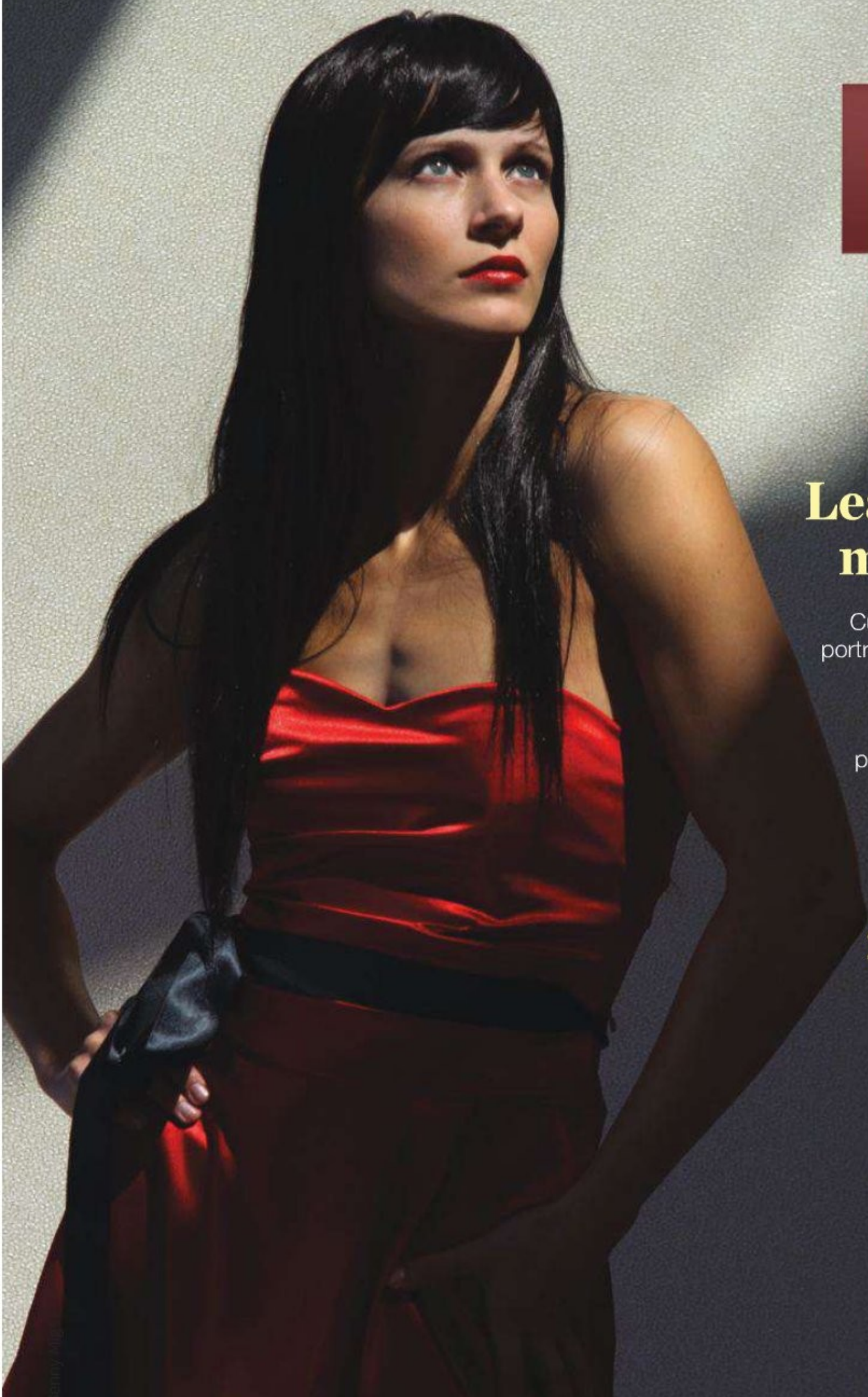

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NEXT

THE HOTTEST NEW STUFF AND THE TECHNOLOGY TRENDS BEHIND IT

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ROUNDUP: RECENT MACRO LENSES FOR DSLRS

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WE WANT THIS

MAGIC EYE

Samsung's latest ILC promises 3D—with one lens

FOR YEARS, shooting in three dimensions generally meant shooting with two lenses. But with its newest interchangeable-lens compact, the NX300, Samsung has taken a different approach. A new 45mm f/1.8 lens uses internal twin LCD shutters to alternate between capturing left- and right-eye views through its single optic.

For 3D video, it records 60 progressive-scan 1920x1080 pixel frames per second divided between two 30-fps feeds, one for each eye. This works just on the NX300; Samsung says its DRIMe IV processor is its only one that can handle all those frames.

With no viewfinder port to speak of, the NX300's stunning 3.31-inch, 768,000-dot AMOLED touch display takes center stage. But the real star may be its sensor. The newly designed 20.3MP APS-C-size imager has an astonishing 105 phase- and 247 contrast-detection autofocus points.

SAMSUNG NX300

20.3MP CMOS APS-C sensor
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NEXT * JUST OUT

NEW ONES

The entry-level to Nikon's 1 ILC system gets crowded

NIKON KEEPS rolling out updates and additions to its 1 system of ILCs at an astonishing clip. The newest are the J3 and S1, the latter giving rise to a new line.

Both models have much in common, including a 3-inch LCD, hybrid autofocus (with 73 phase-detection AF points), and the Nikon 1 V2's Expeed 3A image processor. Both provide the same pop-up flash, shooting modes, and ISO range (160–6400). And both boast absurd burst rates; without AF tracking, they can shoot 60 frames per second (with it, the J3 hits 15 fps).

Nikon's Slow View mode stores images in a buffer when you press the shutter halfway, then as it plays them back in slow motion, you click the shutter to record the desired frame.

The biggest difference between the two is the sensor—the S1 has a 10.1MP CX-format chip and the J3 a 14.2MP version. They debut alongside new 6.7–13mm (18–35mm full-frame equivalent) f/3.5–5.6 and 10–100mm (27–270mm equivalent) f/4–5.6 VR lenses. The cameras are sold as kits with an 11–27.5mm f/3.5–5.6 zoom for the S1 and a 10–30mm f/3.5–5.6 VR for the J3.

Nikon S1 and J3
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NEWS FEED

> Polaroid plans to open a series of stores across the U.S. called Fotobars, where shoppers can make high-quality prints of their smartphone photos and other digital images.

> Canon devotees are mourning the loss of the now-discontinued Canon EOS 5D Mark II.

INSIDE TECH

Dock It

With the new USB dock, owners of the newest (and forthcoming) Sigma lenses can update firmware via the Internet and use Sigma's Optimization Pro software to adjust focus parameters, with four options for primes and 16 for zooms. On a "Sports" lens, you can further tweak AF speed, image stabilization, and focus-limiter settings.

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CHANGING PHOTOGRAPHY G

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LUMIX GH3

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NEXT * JUST OUT

OM POWER

Olympus's new compact embarrasses your smartphone

WITH SMARTPHONES stealing market share from compacts, camera makers are looking to maintain an edge. Olympus's answer? To port high-end features from its flagship ILCs to their tiny-sensored bretheren.

The SH-50's 16MP backlit CMOS sensor pushes data to a TruePic VI processor previously seen in the top-of-the-line OM-D E-M5. It also adds the OM-D's five-axis video stabilization to steady shots at the long end of its 24X optical zoom.

Full HD tops out at 30 fps, but slow-motion lovers can lower the resolution to get up to 240 fps.

Olympus SH-50
$300, estimated street
www.getolympus.com

ON-BOARD JUICE

Cord-free location strobes with internal batteries

PRIOLITE, A GERMAN newcomer to location lighting, hits our shores with a set of game-changing monolights that contain integrated, swappable Li-Ion power sources. With the optional radio remote control ($229, street), these monolights are the first to operate completely cord-free. The 500 watt-second MBX500 and 1000 Ws MBX1000 units can provide 400 and 160 full-power pops, respectively, per charge, and accept Hensel and S-type modifiers.

Priolite MBX500 and MB1000
$1,479 and $1,709, street
www.priolite.com

NEWS FEED

> Reversing its decision to stop selling repair parts, Nikon has reinstated its Nikon Parts Store, once again selling a very limited selection of parts directly to consumers on the web.

> Digitize your negatives the lo-fi way with the Lomography's Smartphone Film Scanner. The Kickstarter-funded smartphone attachment works with an Android/iOS app to let you share your film photos fast.

> Photo-journalist John D. McHugh is the brain behind Markstа, a $2 iPhone app that lets you easily create a unique watermark to apply to your images before you send them.

> Fujifilm showed off its X-series updates at International CES: the X20 and X100S. The latter offers "digital split image" viewing for easier manual focus.

New Software

Alien Skin Eye Candy 7

Adobe's Photoshop is an essential tool for photographers and designers, but adding effects manually can be arduous. Eye Candy 7 ($299, direct, www.alienskin.com) the newest version of Alien Skin's graphic effects software, is a Photoshop plugin that simplifies implementation of effects like perspective shadows, motion trails, and textures (such as Chrome, Reptile Skin, and Fur). It comes loaded with presets, but still leaves room for endless customization.

THE LOWDOWN

COMING: 20-INCH TABLET

January's International CES always has a surprise tool for photographers. This year's was a Panasonic tablet whose 20-inch touch-sensitive LCD boasts 4K resolution (3840x2560 pixels), more than twice that of full HD. Running the Windows 8 Pro 64 Bit OS and using a high-precision pen, this portable display could change how we work with photos. Look for it in late 2013.

MetalPrints

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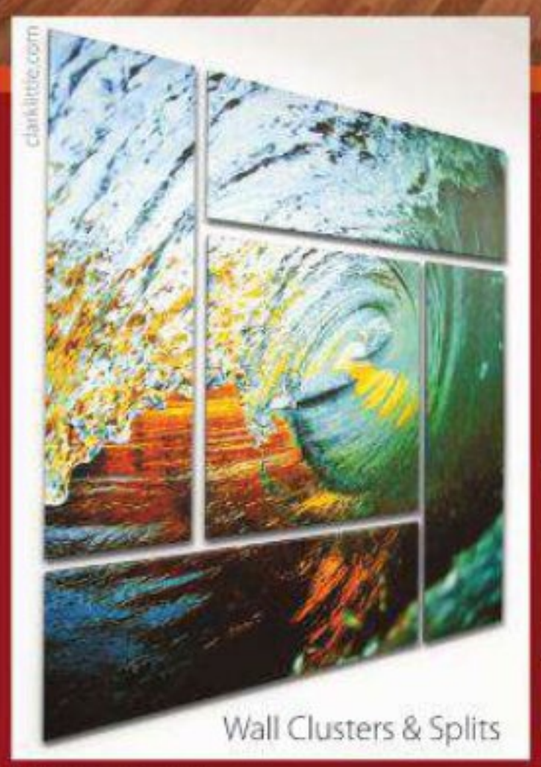
Stephen W. Oachs Envisioned

14 x 7 FEET of MetalPrints...



"And here we have it -- a quadtych of my 551 mega-pixel multi-row panoramic of Bryce Canyon from the winter of 2010. This print is 14 x 7 feet and there is NO pixelation. If you stand even a few inches away it's perfectly clear and sharp. The resolution on this is stunning. My good friends at Bay Photo Lab spent the last few days creating this high gloss print on metal for my gallery at Aperture Academy."

- Stephen W. Oachs, apertureacademy.com

Portrait of Stephen W. Oachs by Steve Kurtz - kurtzphoto.com

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NO JERK

IMAGE-STABILIZED lenses debuted eons ago, but it took years before the technology migrated to high-magnification macro lenses. Now there's a full array of prime and zoom macros that can often get you as close as 1:1, *sans* tripod. Here are a few of our favorites.

NEW GUY
Tamron's 90mm full-frame macro lens was unveiled in November 2012 and is the newest member of the burgeoning stabilized close-up club.

Sigma 180mm f/2.8 APO Macro OS $1,699
A popular tele length, 180mm primes exist in many lens catalogs. This full-framer is the only one with stabilization, which netted us an admirable 3 extra stops of handholdable sharpness. It comes with a lenshood adapter for APS-C bodies.

Canon EF 24–70mm f/4L IS $1,499
With maximum subject magnification of 1:1.4, this full-framer offers durable construction, rapid and quiet AF, and a stabilizer that's effective at its tight, 8-inch focusing distance. The best part? The price: $800 less than the nonstabilized 24–70mm f/2.8.

Canon 100mm f/2.8L IS USM Macro $1,049
As noted in our March 2010 test, the lens was the first with Canon's "hybrid" stabilizer that compensates for shake and slight camera tilt (a.k.a. roll). Our tests found up to 3.5 extra stops of handheld sharpness, among the best ever.

Tamron SP 90mm f/2.8 DI $749
With stabilization, a huge manual-focus ring, and an internal-focusing design that makes the use of lens-mounted macro flashes very doable, this lens is unusually well suited to close-up photography. And that 90mm focal length is perfect for portraits.

Nikon 85mm f/3.5 ED DX VR Nikkor $527
Nikon's first 1:1 macro lens in the DX format, this is also the only non-full-frame stabilized macro lens featured here. In our tests, it showed extremely well-controlled barrel distortion and no light falloff in the macro range.

NEWS FEED

> Finally arriving stateside, the 24.1MP Nikon D5200 DSLR will soon be available for $797, street. With a 39-point AF system, 1080p video, and an articulating LCD, it was among the best new cameras we saw at CES.

> Get in touch with your inner James Bond with Panasonic's HX-A100, a compact, sexy answer to GoPro's clunky action cams. The $300 camera has a separate, corded lens that can be clipped onto a helmet, ear, or anything else.

> Canadian company Urthecast will begin streaming imaging straight from the International Space Station to the Web, starting this fall. New technology will allow anything larger than about 16 feet long to be captured in both video and still images as the ISS orbits the earth.

TOOLBOX

HARD CASE

Hoya's HD2 filters take a beating so your lens won't

USING A filter is a great way to protect your precious lenses in the field. But your lens is only as safe as your filter is strong. Enter Hoya, which has developed a hardened, scratch- and stain-resistant optical glass that the company says has four times the strength of typical optical filters.

At the 2013 International CES show in Las Vegas, we saw a demonstration of this confidence as a Hoya rep repeatedly bludgeoned a 1mm-thin HD2 filter ($51–$224, street; thkphoto.com) with a pipe. You can find our video on PopPhoto.com.

The UV and clear Protector filters have lifetime limited warranties. The circular polarizer's warranty lasts only 5 years—but with its beautifully smooth turning action, you won't want to treat it roughly.

67

Percentage of ILC owners that own DSLR cameras

33

Percentage that are first-time buyers or upgraded from point-and-shoots

SOURCE: InfoTrends, 2012

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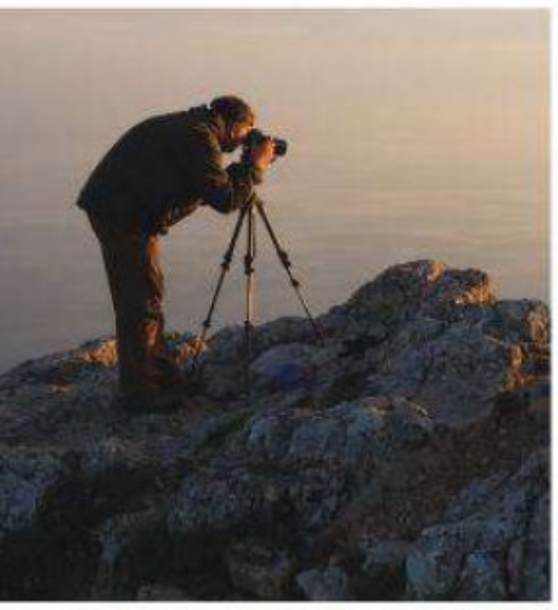

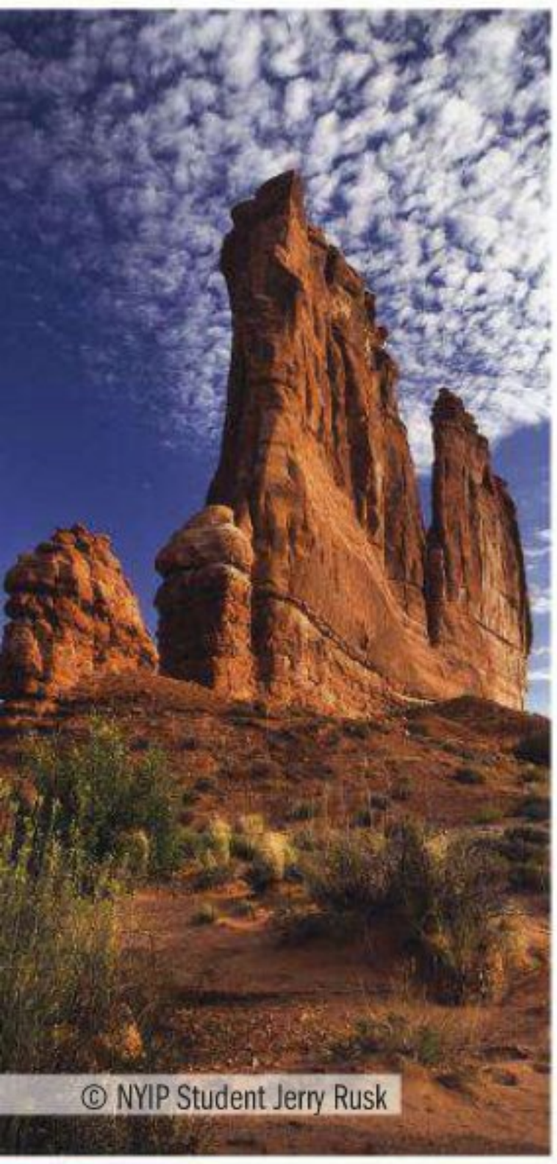

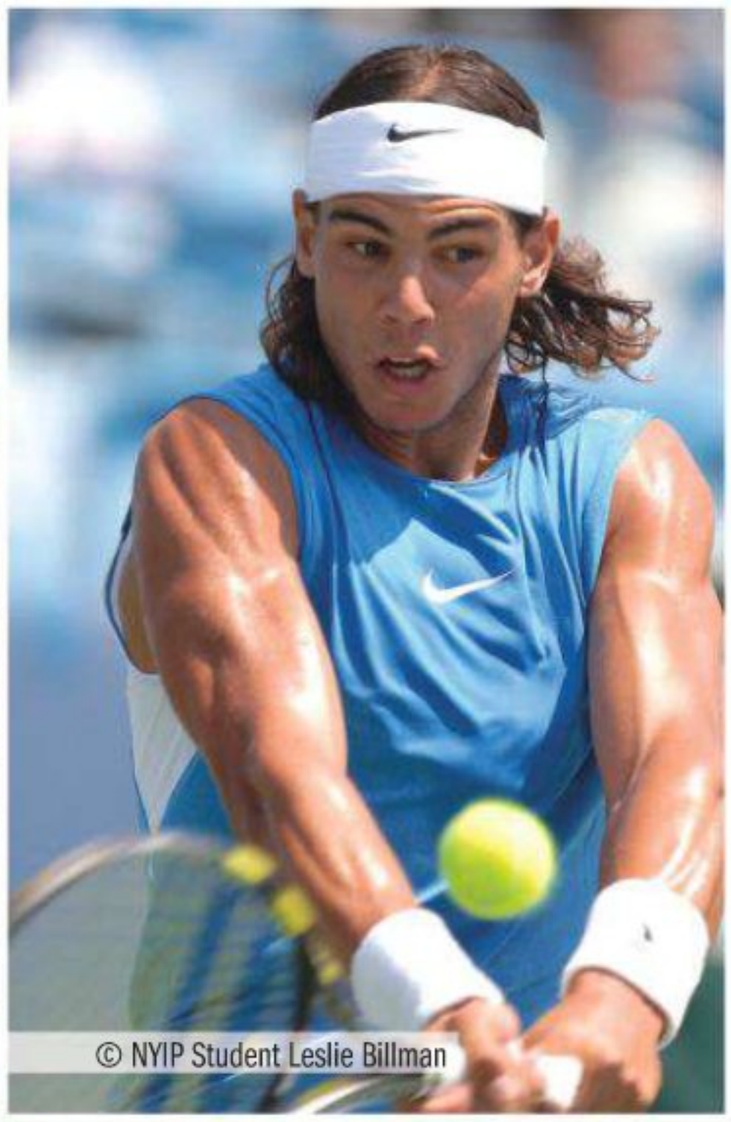

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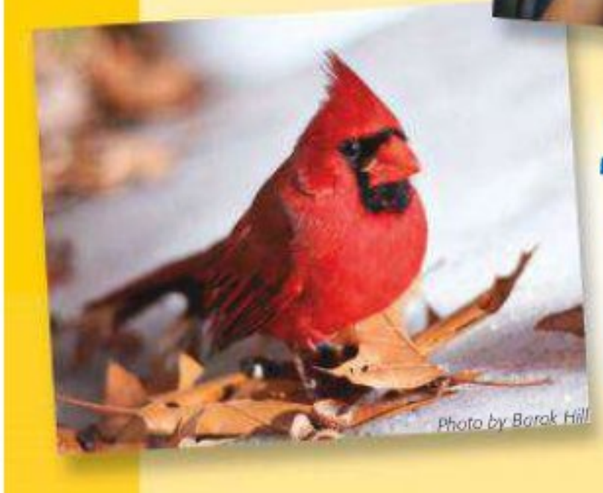

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CAPTURING DANCERS SWIMMINGLY 20

HE BRINGS MODEL TRAINS TO LIFE 22

YOUR BEST PHOTOS OF THE MONTH 28

SHADOW BUSTER

Battling the morning sun with a single strobe

AWAKENING TO a slew of missed text messages, Braxton Wilhelmsen saw his dawn shoot get off to an inauspicious start. By the time he carried all his gear down into Utah's Diamond Fork Canyon, it was already 6 a.m. on a cold September day. But for his subjects, sport hunters Kaydee Condie and Jessica Hortman, rising early was no chore. "They love being out early in their gear anyway," he says.

Wilhelmsen fought the shadows typically cast by early morning sunlight with a single Paul C. Buff Alien Bees B800 strobe and Vagabond Mini power pack. With this shot of Condie drawing her Hoyt compound bow, taken with a Canon EOS Rebel T3i and EF 50mm f/1.4 USM lens (at 1/250 sec at f/7.1, ISO 100), he won our challenge for your best natural-light photo using fill flash.

For the 29-year-old Utah pro, it was just another day at the office: "A nice walk, in a beautiful place, doing what I enjoy," he says. ***—Matthew Ismael Ruiz***

NEXT PHOTO CHALLENGE **On page 22, Paul Dolkos talks about his career shooting miniature layouts of model railroads. Send us your best photos of miniatures; you could win $100 (and your photo here). Rules: PopPhoto.com/contests.**

Fluid Moves

Shooting dancers who swim on dry land

A NEWS JUNKIE, pro photographer Brian Kuhlmann is often angered by headlines on preventable catastrophes. But he had never been so riled by an event, he says, that he felt the need to address it creatively—until the Deepwater Horizon oil spill of 2010. "It got under my skin and bothered me for months" before he decided to put the energy to use in a photo shoot, he says.

Based in Chicago for several years (he now also operates a studio in L.A.), Kuhlmann had longstanding relationships with local dance studios from his performance and commercial work. "I had the idea of interpreting the experience of being submerged," he explains, so he called a friend at Hubbard Street Dance and arranged a shoot with six performers to enact his idea.

Pro Brian Kuhlmann has shot for the likes of Gatorade, HBO, and *Chicago Magazine*.

BRIAN KUHLMANN (8)

Kuhlmann shot images of his models at exposures around 1/8 sec and 1/15 sec at f/8, ISO 100. See more of his work at brian kuhlmann.com

Kuhlman scoured local fabric stores for material that would match the colors and translucence of underwater sea life. Next, he set up his studio with a black backdrop, beauty fans positioned to float the fabric, one HMI continuous light, and a single Broncolor strobe.

With the help of assistants and his fiancée/art director, he photographed the dancers over the course of six hours as they created gestures of being trapped in a state of viscosity. He made several hundred exposures on his tethered Hasselblad H2, constantly checking the monitor to make adjustments.

Then he saved the files and let them sit—in part because he wasn't sure what to do with the resulting photographs. That is, until he rediscovered them six months ago. "I realized how beautiful the images really were" and rekindled his passion for the subject, he says. He made some edits and compiled them into the series, "In the Fray."

Says Kuhlmann, "I've often been asked if the images were shot underwater, which was the look I was going for."

The series has also brought him back to his initial plan to use the shoot as a sketch for a long-term project. "I wanted to photograph the anxiety and tension of that moment," he explains. "This gives me a starting point." ***—Lori Fredrickson***

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Classic Model

Model railroader brings layouts to life from behind the lens

Paul Dolkos, seen here with his Baltimore layout, has shot model railroad layouts for decades for magazines such as *Model Railroader*. You can see his work at PopPhoto.com/dolkos.

DOUGLAS SONDERS

What led you to photograph model trains?

Some grow up liking girls and beer—I also liked trains. In terms of photography, that was my father's hobby—he had lots of nice cameras. *Popular Photography* was probably the first magazine I ever read. I started taking pictures for the high school newspaper, with a little compact 2¼x3¼ Speed Graphic. Once I started building trains, I got to know other model railroaders. One was a professional photographer, and he urged me—back in the '60s—to start taking pictures of models, wisely advising me to "do it in color." One thing led to another; I sent an article into Kalmbach Publishing and started doing some work. That was 1975.

Workin' on the Railroad
Download the free PopPhoto Interactive app and point your Android or iOS device at this page to see photos by Paul Dolkos.

Describe your approach.

I take pictures of real trains. When the typical person takes a picture of a locomotive, it's usually a three-quarter view, and they all look alike. How do you tell the story? I ask, "What environment is this railroad is in? What does it do?" I take the same approach to a model—I try to capture scenes. For my Boston & Maine New Hampshire division layout, I tried to include the unique architecture up there. It's different than suburban New York—the amount of Greek Revival architecture. I found it very attractive.

How do you light your scenes?

Everything is taken on a tripod using continuous light sources. I use Lowel Tota- and Omni-lights—you can shoot under fluorescents, but the lighting is very diffused. With hot lights, you can create shadows, like the sun.

What equipment do you use?

I don't need a lot of horsepower, as far as cameras go. I started with a Rolleiflex and I had a Linhof 4x5. Now I use a couple of very basic Canons. I started shooting digital several years ago with the first EOS Digital Rebel. I decided I needed a backup, so I just bought a Rebel T1i with the 18–55mm f/3.5–5.6 IS kit lens. It's perfect for model railroading. It focuses close (9 inches) and stops down to as much as f/36, which is very important. We're taking photographs of things fairly close up, and you need the depth of field to go maybe six feet back. You can't just have the front of the locomotive in focus and have everything else fuzzy.

Do you achieve your depth of field solely in the camera?

I use software called Helicon Focus for extended depth of field and focus-stacking. You take several photographs at different focal points, and the software takes the sharpest point of each exposure and combines it into a single exposure. That means I can have a finger practically touching the lens in focus, and 20 feet away have the wall in focus. If it's a routine picture that won't get blown up, I'll stop down to f/29 or higher to get the depth of field. But if it could be on the magazine's cover or a double-page spread, I open the lens up where it should be, f/8.

Are you primarily a photographer or a model railroader?

I really think I'm both. Over the years, I've done everything from weddings to news photography, but now I specialize in model-railroad photography. It would be tough to do model photography without also being a serious model railroader. I want to inspire others to improve their modeling skills. The ideal photograph, a guy looks at it and says, "Oh, I didn't know that was a model." When you do that, you know you've done it well.

—Interview by Matthew Ismael Ruiz

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Belize It!

I am a Belizean, born and raised, and I was able to really appreciate your article "A Trek in Belize" (January 2013). I work in real estate and marketing, and as a local, I can attest to the authenticity of the journalism and the excellence of the recommendations. I am so happy and proud to see our country featured in a periodical of your stature, and I hope one day you can do a sequel. I'd be happy to help in any way! Kudos to Ian Plant and PopPhoto!

Carlo Habet
Belize City, Belize

I WAS LOOKING forward to my January *Popular Photography* for the Camera of the Year announcement. I cannot tell you how disappointed I was to see the [subscriber] cover—a bloody mess of a pathetic man. For those of us who are not fans of violence (and do not consider any games intended to injure as sport), it is very sad to see a magazine that we purchase and subscribe to highlight this horrible blood game. This is not at all what most of your readers are looking for as aspiring photographers. This is not art at all.

Brian Luenser
Fort Worth, TX

I READ Ian Plant's article "Learning to Adapt" (February 2013) with great interest. This idea has intrigued me for years, but I'd like to fully understand what I'm getting into. When you put an adapter on a lens you are moving the lens farther from the film plane. It's sort of like using a limited extension tube. Does this adapter allow you to focus slightly closer but limit the ability to focus at infinity?

Tom Shaffer
Cheyenne, WY

EDITOR'S NOTE: ***Most high-quality lens adapters are designed to retain infinity focus. Many adapters do move the adapted lens farther from the sensor than the lenses of the native system, but only to match the distance used in the system from which the adapted lens comes. For example, if adapting a Nikon lens to a Sony NEX camera, the adapter ensures that the Nikon lens is the same distance from the sensor as it would be if it were mounted on a Nikon. Check with the manufacturer of any adapter you want to buy to ensure that it does what you want it to do.***

POPULAR PHOTOGRAPHY

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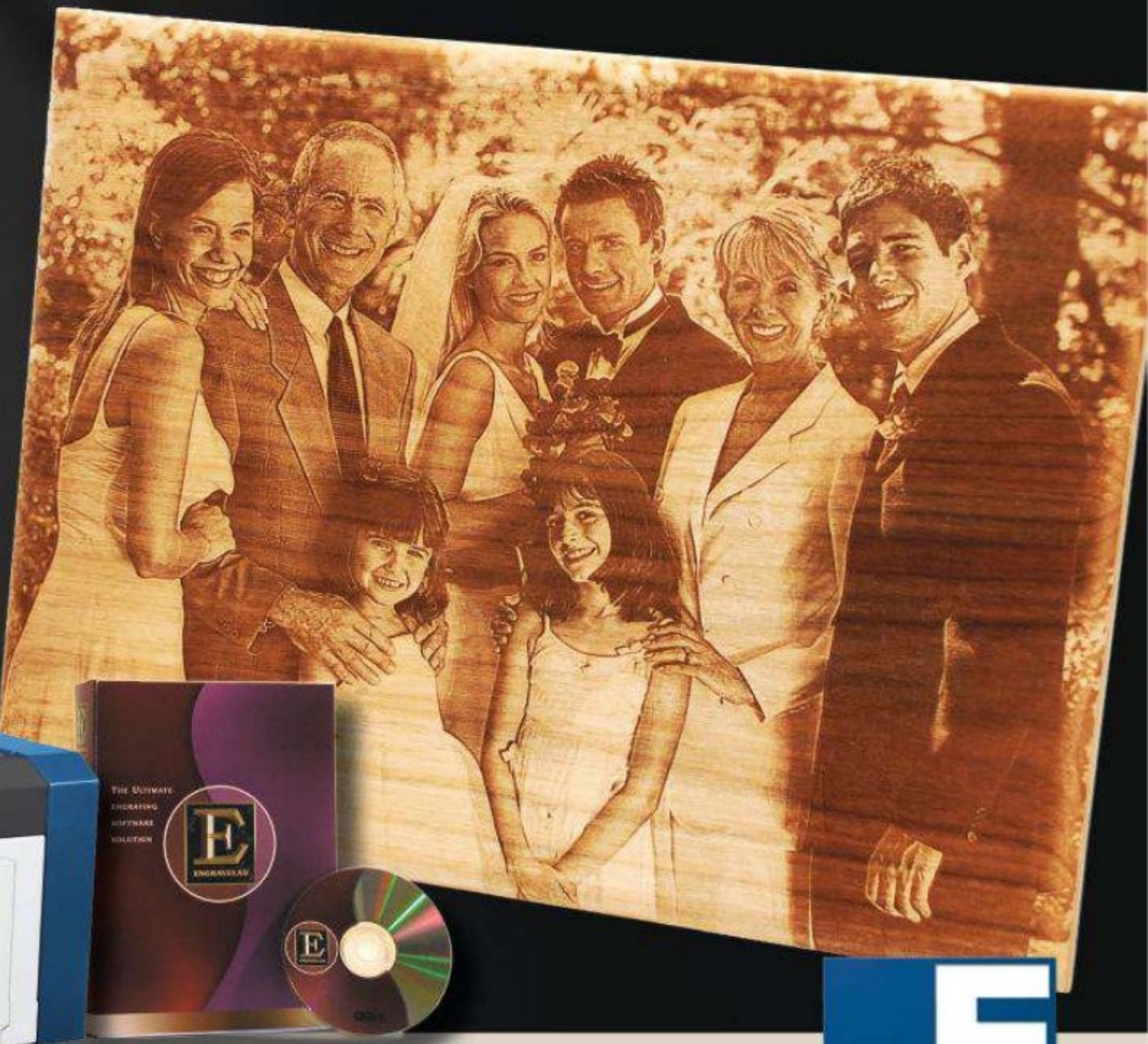

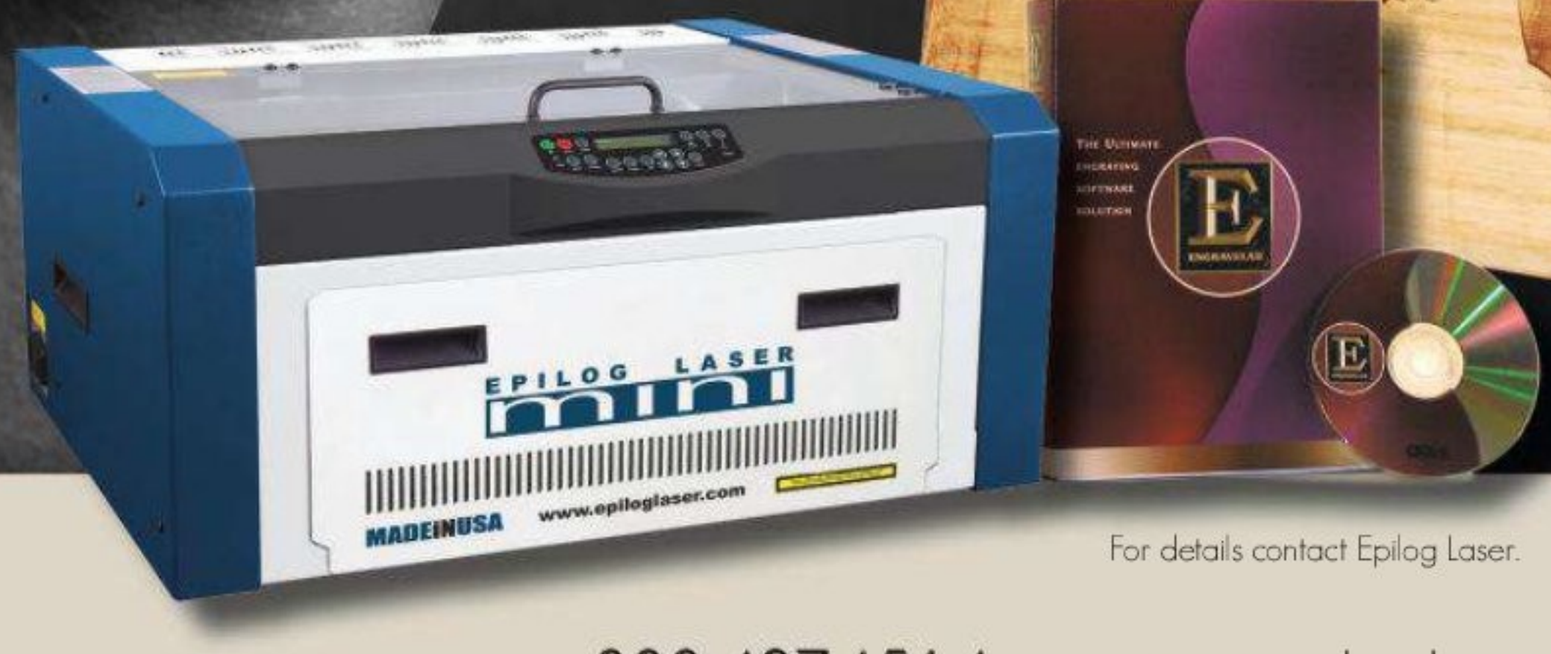

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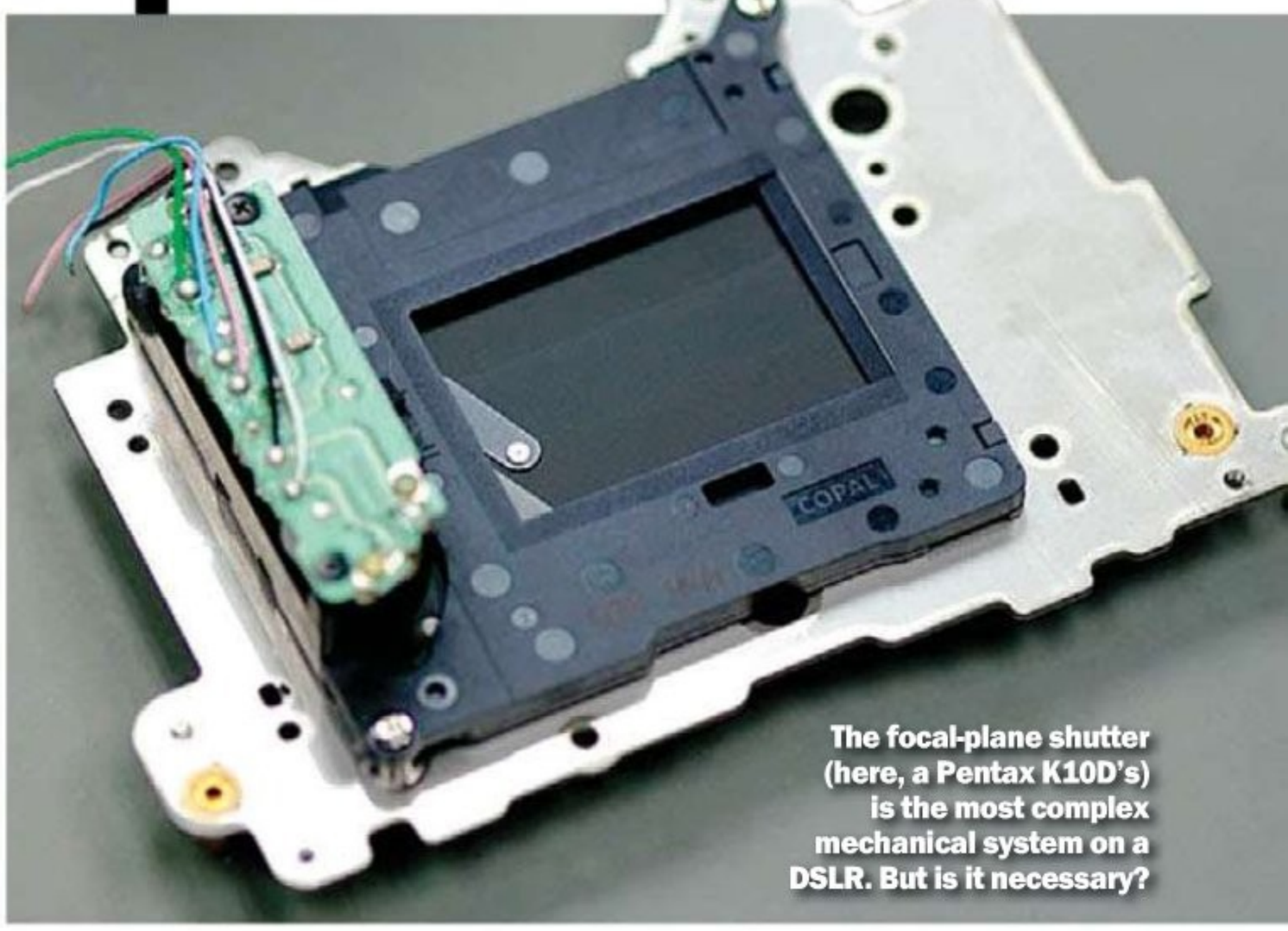

The focal-plane shutter (here, a Pentax K10D's) is the most complex mechanical system on a DSLR. But is it necessary?

REGULAR READER José Castiel wrote us with an intriguing question. "Why do digital SLR cameras need a mechanical shutter like film SLRs?" he asks. "Why can't DSLRs just use an electronic shutter like digital compacts use? If you remove the mechanical shutter from a DSLR, wouldn't it be more reliable—fewer moving parts—and weigh significantly less (because there is no need for a mirror, mirror-retraction mechanism, and heavy glass pentaprism)? They could also be cheaper."

He is referring to the method digital compacts use to time exposures: The digital sensor itself acts as a shutter, turning on and turning off the pixels for the chosen length of time. DSLRs, on the other hand, use a focal-plane shutter that opens and closes mechanically to time the exposure. Modern focal-plane shutters use multiple vertical-travel blades made of high-tech stuff like aluminum alloy, carbon fiber, titanium, and the like, but still operate essentially the same way as the cloth shutter in an 80-year old Leica: A curtain opens and another closes behind it.

And while interchangeable-lens compacts (ILCs) have gotten rid of the bulky mirror and pentaprism assembly, they still use physical focal-plane shutters. Why?

First off, let's clear up the terminology: Because modern mechanical shutters are electronically timed, they are often referred to—inaccurately—as "electronic shutters." So we'll refer to them as focal-plane shutters, and call the sensor-based timing used in compacts digital shutters.

It turns out that digital shutters do more than turn the pixels on and off. Older CCD sensors can control exposure timing via interline transfer: Every row of light-sensitive pixels has an adjacent row of non-imaging cells. This allows a circuit design that transfers image

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data from each pixel to its corresponding non-imaging cell simultaneously. The image data then transfers to the camera processor after the shutter "closes." But this limits the surface area of the sensor that can be dedicated to imaging pixels, and these pixels have to be smaller to accommodate the non-imaging components. Power consumption of these sensors is also relatively high.

Modern CMOS sensors can act as digital shutters without interline transfer, but this introduces another problem. These CMOS sensors send out image data from the pixels line by line, a process called a rolling shutter. If subject movement occurs during rolling shutter, it can introduce artifacts or distortion of various kinds, with self-explanatory colloquial names like skew, smear, and the jello effect.

The focal-plane shutter solves this problem (at least for still capture; video is another story). The mechanical shutter keeps the sensor in the dark until the moment of exposure, then closes the curtain so that data transfer can proceed in the dark. Put another way, a focal-plane shutter's blades can move faster than data can be taken off the sensor.

Camera industry insiders tell us that it's only a matter of time before CMOS sensors in DSLRs allow data transfer without the use of a rolling shutter, at which point focal-plane shutters will start to go away. (Such technology already exists, in the so-called global shutters for video cameras such as Sony's F55.)

Until then, though, we'll have to put up with the click-clack of mechanical shutters.

Q&A Low Blow to ISO

Q I am looking to replace my well-used Panasonic Lumix G1. The Olympus OM-D E-M5 looks like a good choice, but its ISO range starts at ISO 200. Most of the time I shoot at ISO 100, and I rarely shoot beyond ISO 800. Do I gain anything in picture quality by shooting 16MP at ISO 200 as opposed to 12.1MP at ISO 100? And, it seems to me I'm going to have to add more neutral-density filtering and/or work harder to get soft water effects, traffic trails, and so on that require long time exposures.

Nick Sullivan
Hermitage, TN

A *The proof of the shooting is in the testing. In our Pop Photo lab test of the Olympus OM-D E-M5 (August 2012), it earned an Excellent overall image quality rating at ISO 200–400, which, under our current test standards, would best the Panasonic Lumix G1 at ISO 100–400 by a full rating notch. Specifically, the OM-D resolved 150 more lines per picture height than the G1 at those ISO levels. And while the G1's noise control was superior to the OM-D's at ISO 200—Extremely Low versus Very Low—from thereon up the OM-D had it all over the G1: It hit Unacceptable noise levels at ISO 6400, while the Panasonic's noise was already at that level by ISO 1600. Both cameras turned in Excellent color accuracy; while the Panasonic had a better rating score here, we think the difference would be imperceptible to most users in most applications.*

And the OM-D is one sweet-handling camera, rugged and weathersealed. So we'd say go for it. We do, however, share your disquiet over the lack of an ISO 100 setting, but as you note, that's what ND filters are for. Fortunately, most of the lenses offered in the Micro Four Thirds system have relatively small filter rings.

Fields of Gold

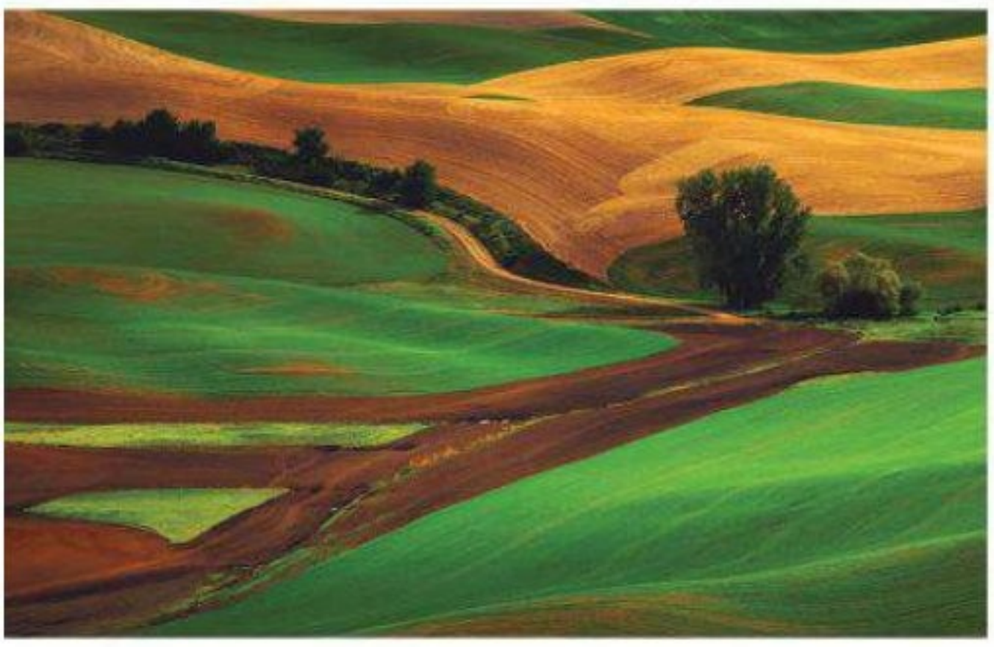
This month's winners find strong hues in wildly different locales

MONTHLY PHOTO CONTEST

Want to enter? Get the official rules and upload your images at PopPhoto.com/contests.

3rd Place $100 Prize

MICHEL HERSEN, 72, PSYCHOLOGIST (RETIRED), PORTLAND, OR This image, taken in Steptoe Butte State Park, is from a series of shots I took in the Palouse area of Washington. The patterns created by the farmers reminded me of a Grant Wood painting. I wanted the viewer to follow the leading lines toward the tallest tree. In this one, all the elements came together: light, composition, and line. **TECH INFO: Nikon D300 with 18–200mm f/3.5–5.6 Nikkor lens and Tiffen circular polarizer on a Gitzo tripod and Arca-Swiss head; 1/80 sec at f/18, ISO 200. Color correction in Adobe Photoshop CS5.**



2nd Place $200 Prize

WILLIAM WOODWARD, 27, PROJECT MANAGER, KIRKLAND, IL The Roman Pool at Hearst Castle in San Simeon, CA, is itself a work of art. The gold you see is actual gold—they used clear glass infused with gold leaf. Achieving symmetry was most challenging; a railing prevented me from getting to the water's edge, so I had to convince the lone guard to let me place my camera on the opposite side of the fence and reach through the railing to take the shots. I bracketed three exposures (+2/0/–2 exposure compensation), and at home I merged the three images in Photoshop. **TECH INFO: Nikon D7000 with 10–24mm f/3.5–4.5 Nikkor lens on Sirui M3204 tripod with Smith-Victor ball head; 8 sec at f/9, ISO 100. Basic edits in Photoshop Lightroom 4; three-shot bracket combined in Photoshop CS6.**

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1st Place
$300 Prize

AZIZ AL-ASOUSI, 33, POLICE OFFICER, SURRA TOWN, KUWAIT In August 2012, I took in my first safari at the Masai Mara National Reserve in southwestern Kenya. I have always been inspired by wildlife photographer Steve Bloom's portfolio, and it certainly influenced this shot. Just before sunset, the light was perfect; when I saw the lion gazing into the sun, I knew the shot would be all about his look.

TECH INFO: Canon EOS-1D Mark IV with 500mm f/4L IS USM Canon EF lens; 1/400 sec at f/5, ISO 800. Color adjusted in Nik Color Efex Pro 4, levels adjusted in Photoshop CS5.

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HOW

EXPERT TIPS AND TECHNIQUES FOR BETTER PHOTOS

CROP FOR EMPHASIS; CONCEPTUALIZE TO FLEX YOUR CREATIVITY 34

EXPLORE CHARLESTON'S CHARMS 36

PREP AND PRINT IN LIGHTROOM 4 38

42

LYNTON CRABB

CREATIVE THINKING

SHOP SHOOTING

Grab a camera on your way to the market

MARKETPLACES around the world are visual siren songs for photographers. The chaos and color of shapes, people, and patterns taunt even the most experienced shooter to find order amidst the ever-changing scenery. To meet this challenge, Australian lifestyle and advertising photographer Lynton Crabb keeps things simple: one camera, one lens. "It allows me to just observe and click," he says.

Crabb has found that when his choices are limited, he learns to express his visual message with the gear he has. "It also helps

For more of Lynton Crabb's lifestyle, advertising, and travel photography, visit crabb.com.au.

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the individual body of work jell together as a series," he says.

Similarly, when you enhance the detail in a photograph, you concentrate the mood and the message within the frame. Crabb did just that in this shot of birdcages by going a step further and interpreting the shot with a postprocessing technique that mimics stencil drawings.

The story? Crabb was on assignment for a hotel in Bali and took a break from the job by exploring the local market. He took a Canon EOS-1Ds Mark II with a 24–70mm f/2.8L Canon zoom. Often looking for architectural shapes and patterns, he was immediately attracted to a stall of small birds for sale. Their cages were stacked up and they reminded him of a block of apartments. "The light was reflecting off the cages and emphasizing the bars, making it really high-key," he says.

The high-contrast nature of the scene and the pattern of cages made a great shot, but Crabb felt it to be a perfect candidate for further postprocessing experiments. Inspired by the way screen printing can accentuate positive and negative space by reducing detail, Crabb began by inverting the image in Adobe Photoshop. (If you're familiar with color negative film, you will recognize the result of this step.) Then Crabb altered the colors and masked select areas for the striking effect you see here.

"I try to create emotional impact through the composition and the graphic nature of the subject," he says. "This kind of image seems to gain momentum the longer you look at it. As you look you discover the birds, for example, and other details."

It might make you wonder what you could discover at *your* local market. *—Laurence Chen*

Zoom In

Crop to emphasize a subject

Constantino racked out his 70–300mm f/4.5–5.6 AF-S Nikkor all the way to 300mm to capture the farmer in the distance. Exposure with a Nikon D200: 1/400 sec at f/10, ISO 400.

VINCENT COSTANTINO

WHEN WE saw Vincent Constantino's photo of a Chinese farmer along the Li River, we were reminded of Jean-François Millet's paintings. We thought it would be strengthened with a tighter crop to emphasize the solitary figure.

The photographer's JPEG file had enough resolution for the crop, which also allowed us to put the subject more off-center, moving into the frame's space.

In Adobe Photoshop CS6, we took out some blue and green with Curves to produce a warmer color balance. We found the sharp background detail too "crunchy" and distracting; we used the Field Blur filter from the Blur Gallery to soften it. Using a gradient mask on the blurred layer let us apply blur progressively more toward the top of the image.

Total time fixing: 15 minutes.

—Dan Richards and Debbie Grossman

DID YOU KNOW? SUBJECT MAGNIFICATION

READERS OF this magazine's lens tests are familiar with lens subject magnification being expressed as a ratio, such as 1:2. This indicates that the image of an object cast by a lens will be half the size of the actual object. But this is not the only method for expressing subject magnification, which can lead to confusion when comparing lens specs while shopping. The other method uses a percentage of magnification, listed as a multiplication factor. For instance, instead of "1:2," it uses the expression "0.5X" to indicate half lifesize (0.5 times a number is 50 percent of it), or it lists "0.25X" for 1/4 lifesize. To convert from multipliers to ratios, simply divide 1 by the number before the X. For example, 1/0.25 = 4, or 1:4. To get a multiplication factor, divide the first number of the ratio by the second—for instance, 1/4 = 0.25X.

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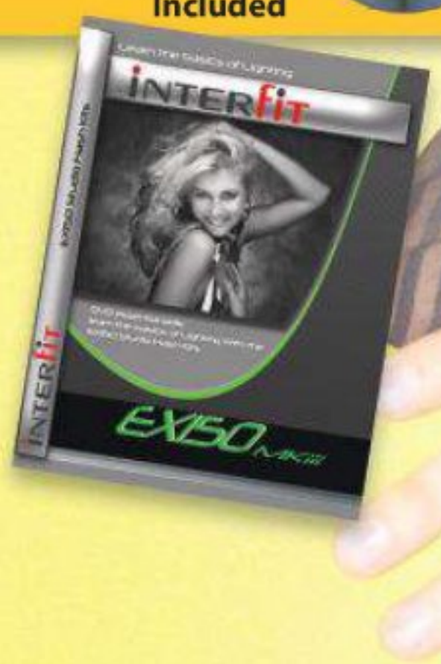

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Dixie Belle

How to capture Charleston's charms

IF YOU ARE drawn to photographing nature's majesty, a visit to Charleston, SC, will reward you with one of the North America's most glorious arborial assets: the massive Angel Oak tree. Thought to be among the oldest living things on the continent, the six-story-tall behemoth is one of many Charlestonian attractions.

"It's a beautiful city," says photographer Steven Hyatt (stevenhyattphotography.com) who has been living and shooting there for the past 10 years. "I love the rich history, the beautiful architecture, and that nature is brimming around every corner."

March is especially pretty, he says, with the city's famed camellias in full bloom.

Among Hyatt's inspirations: the city's many lavish church interiors. His favorite is the Unitarian Church on Archdale Street. "It's a Gothic building and the ceiling is ribbed with intricate designs with the tips gilded in gold and set against a blue background," he says. "It's mesmerizing." (The church is open Saturdays from 10 a.m. to 1 p.m.; tripods allowed.) Its adjacent cemetery is overgrown with native plants and wildflowers by creative intent.

The famous live oak named the Angel Oak lives on nearby John's Island. Steven Hyatt made an HDR capture with a Nikon D3s and 24–70mm f/2.8 Nikkor zoom.

Walk to best experience the plentiful antebellum houses. A good route: South Battery past Battery Park, says Hyatt. "This is where the homes that define Charleston are located."

Also fun? Rainbow Row on East Bay Street is a series of brightly colored, tightly packed homes.

Boone Hall Plantation is one of the country's oldest working plantations. Enter through an impressive alley of 250-year-old oak trees; the evocative grounds and flower-filled gardens make a great photo subject for your Charleston stay. *—Jeff Wignall*

STEVEN HYATT

More Reasons to Go

WHY THE CHARLESTON AREA IS SO OFTEN VOTED AMERICA'S PRETTIEST

- **Audubon Center at Francis Beidler Forest**
  Harleyville, SC A bird photographer's paradise, with 140 different species including the colorful painted bunting.
- **Magnolia Cemetery**
  70 Cunnington Ave.
  A must-photograph destination for Charleston's archetypal live oaks dripping their long wisps of Spanish moss.
- **Magnolia Plantation and Gardens**
  3550 Ashley River Rd. Floral fans flock here in March for over 30 species of spring-flowering plants and trees. The stunningly decorated plantation house makes an equally compelling subject. Tours: $8 per person.
- **Middleton Place**
  4300 Ashley River Rd.
  Dating from 1755, America's oldest landscaped gardens offer hordes of camera-ready spring blossoms. Adults: $25.
- **Patriots Point Naval and Maritime Museum**
  Mount Pleasant, SC
  Home to a fleet of historic ships, it offers a stunning vantage point for sunset shots of the Charleston Harbor and the dramatically lit Arthur Ravenel Jr. suspension bridge.

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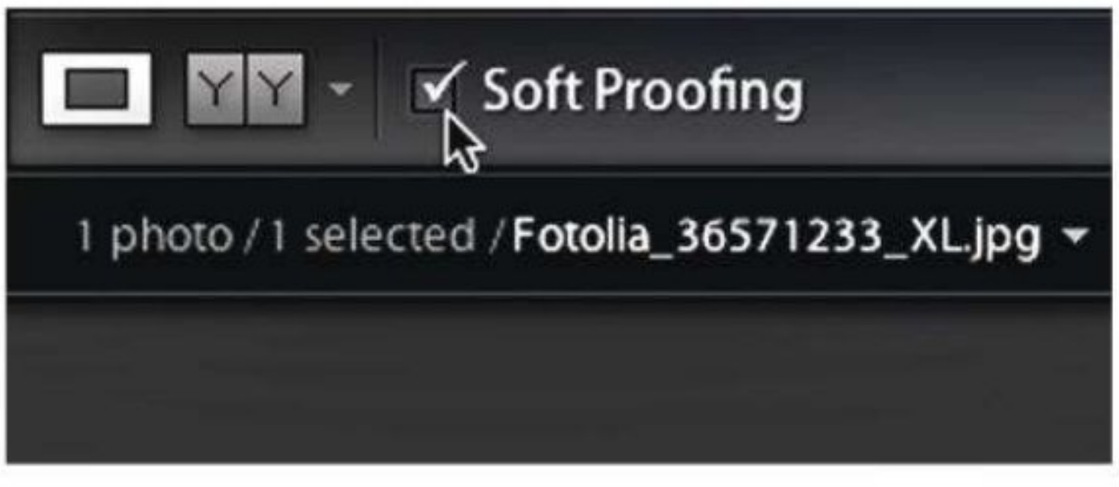
Print in Lightroom

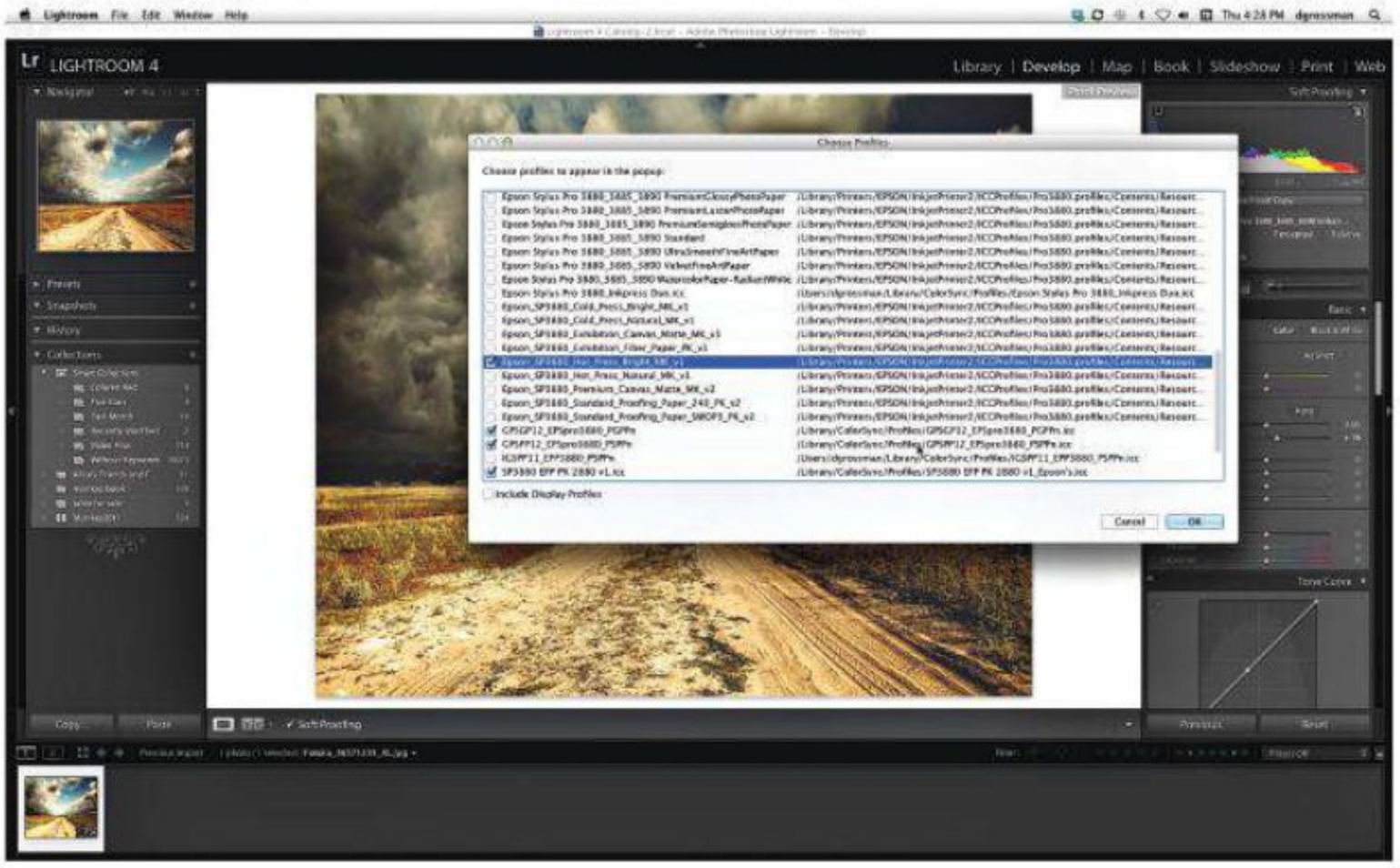
Tips for getting more accurate color and truer print previews in Adobe Photoshop Lightroom 4

VITALY KRIVOSHEEV/FOTOLIA.COM (LANDSCAPE); CLEARVIEWSTOCK/FOTOLIA.COM (FRAME)



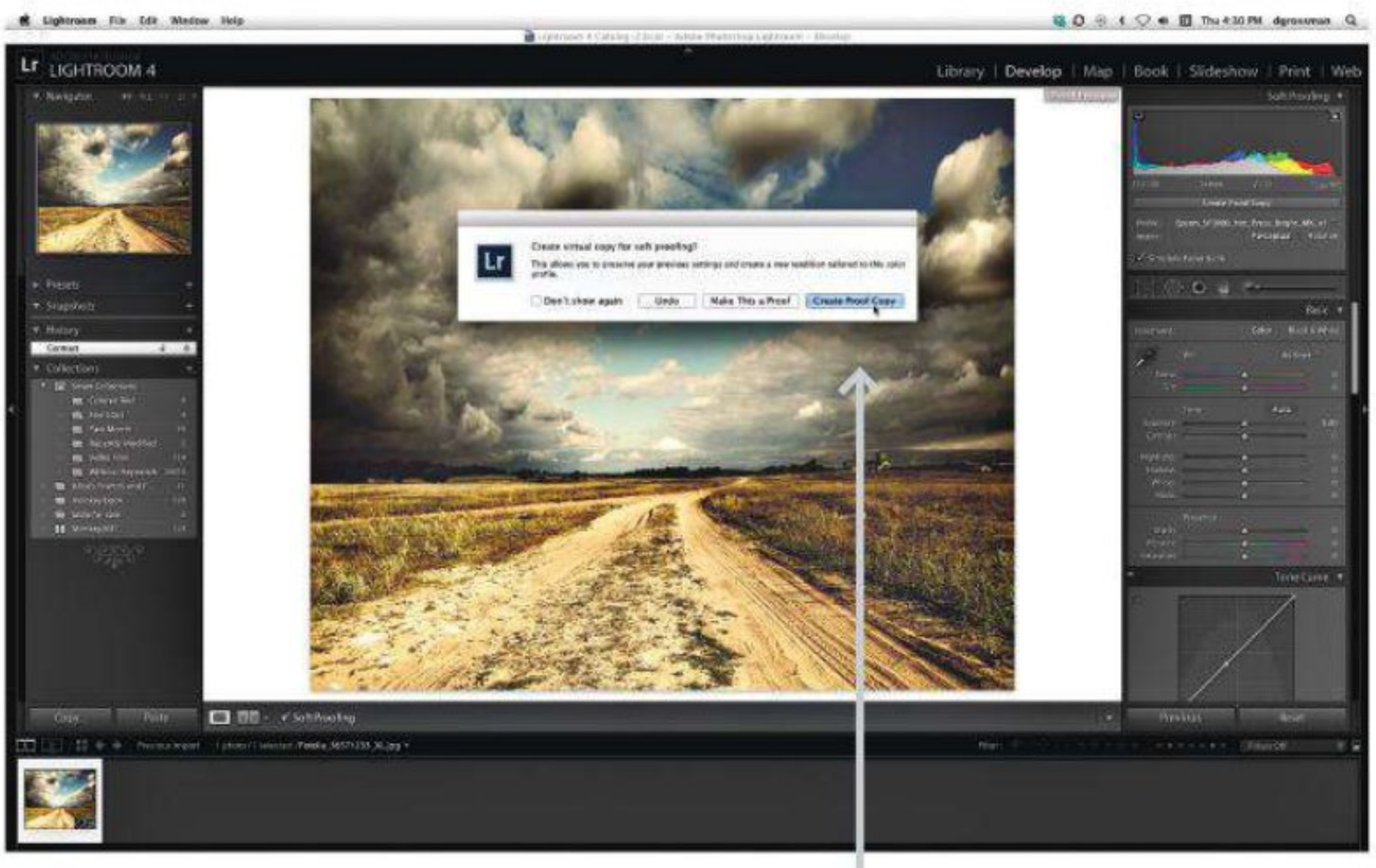
Step 1

Start by importing and converting your file. While still in the Develop module, view your picture in Soft Proof mode, which will give you a better idea of what your image will look like on paper. To do so, check the box for Soft Proofing in the bottom-left corner of the interface. You'll see a new panel pop up in the top right corner. Then use the Profile pulldown menu to pick the profile for the paper you're using.


LIGHTROOM 4
Library | Develop | Map | Book | Slideshow | Print | Web
Choose Profiles
Choose profiles to appear in the popup:
Include Display Profiles
Cancel
OK

Step 2

If you don't see the profile you need, choose Other, check the box for your printer/paper combination, and click OK. To preview the full effect of your paper and ink combo, click to check the box for Simulate Paper & Ink. To see if you have colors that are beyond the capabilities of your paper and ink, click the box in the top right corner of the histogram—you'll see a visual warning on your image of all the colors that won't get represented.


LIGHTROOM 4
Library | Develop | Map | Book | Slideshow | Print | Web
Create virtual copy for soft proofing?
This allows you to preserve your previous settings and create a new rendition tailored to this color profile.
Don't show again
Undo
Make This a Proof
Create Proof Copy

Create a Proof Copy
When making print-specific adjustments, a proof copy is a good idea.

Step 3

This is an image that's being printed on matte paper, so it will lose some contrast in the process. Check and uncheck the Soft Proof box to see the difference. The beauty of soft proofing in the Develop module is that you can adjust your actual RAW file while getting a visual preview of the print. Head up to the Contrast slider in the Basic Panel to add contrast back in. As you go to move the slider, Lightroom will interrupt you to ask if you want to make a Proof Copy. Usually it's a good idea to say yes; doing so will ensure that your revised conversion applies only to this print.

Step 4

Once you've made your adjustments, head over to the Print module to output your image. Click on Page Setup to start. (Note that, despite the fact that on the Mac there are two buttons and on the PC there is one, you can adust the same settings on both systems.) If you're on a Mac, begin with Page Setup to choose your paper size and printer.

LIGHTROOM 4
Library | Develop | Map | Book | Slideshow | Print | Web
Page Setup
Settings: Page Attributes
Format For: EPSON Epson Stylus Pro 3880
Paper Size: US B 11 x 17 in (Manual ...
Orientation:
Scale: 100 %
Cancel
OK

Start with Page Setup
On a Mac, you create a custom paper size (if needed) during this step.

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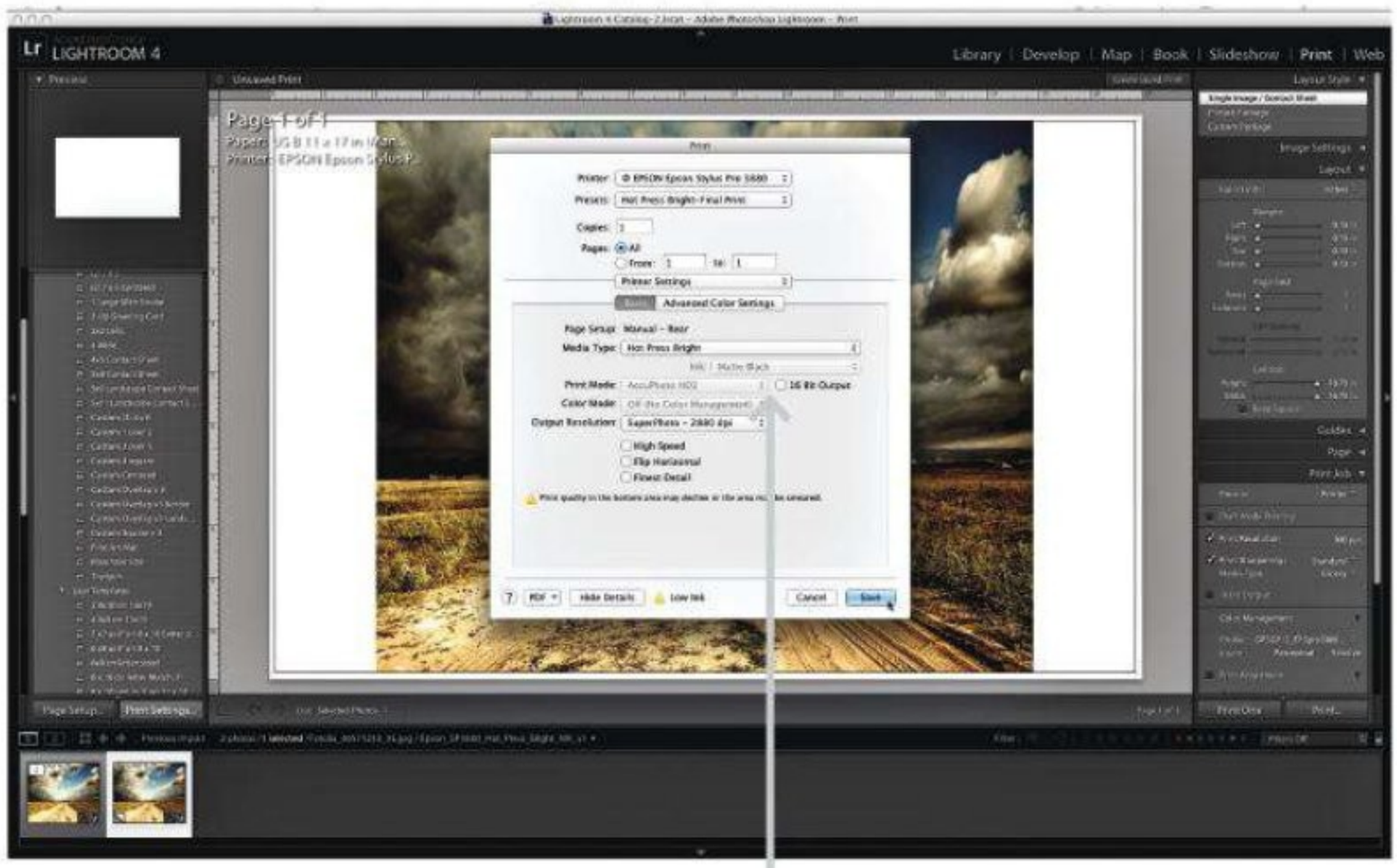
Step 5

Head to Print Settings and choose Printer Settings from the pulldown menu (the dialog box varies with the printer driver and OS). Select the paper type that suits the profile you used for soft proofing and that you'll choose in Step 6. If your paper type is grayed out, see if you need to set it for manual feed; Epson's driver for the Stylus Pro 3880, for example, often requires manual feed for its Fine Art papers. Then fill in the rest of the settings: Make sure Color Mode is turned off so you can pick your own profile later. Choose the best resolution and uncheck High Speed if the print will be framed. Click to save your settings.

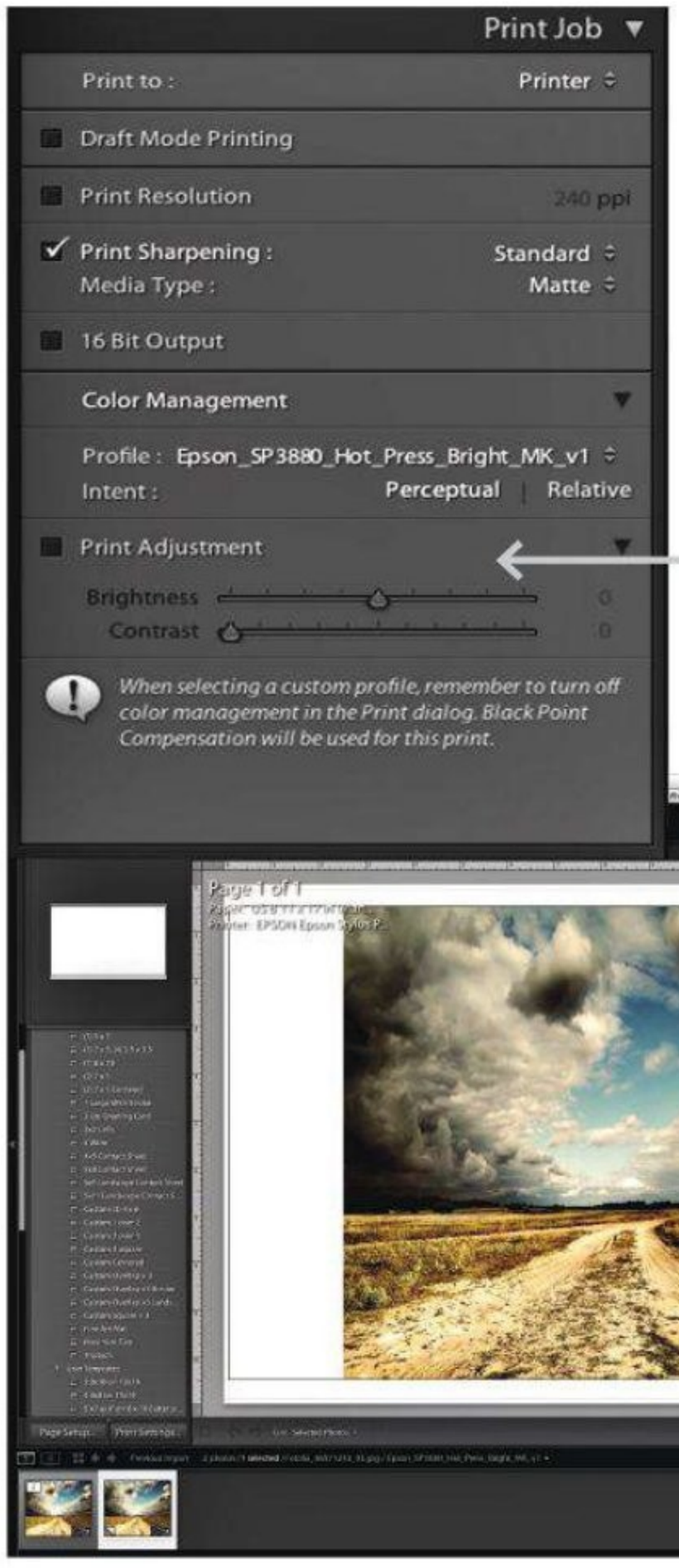


Step 6

On the right side of the interface are all the options for this print. Choose Picture Package under the Layout Style menu to print multiple images on a single page. Image Settings has an option that lets you add a border of any color; Layout lets you pick the margins. Since this photo will be framed, add some border. This is a single image, so slide the Cell Size to the left until you have enough border, or type in the numeric value of the size you need.

Final Step

Finally, send it to print. Uncheck Draft mode unless this is indeed a draft. In most cases, uncheck the Print Resolution box and let Lightroom calculate it. If you happen to have resized and sharpened for a specific resolution in Photoshop, though, input that resolution now. Pick your media type (matte or glossy) and set the sharpening. The amount is subjective, but it's a good idea to err on the side of less sharpening; we usually set Low or Standard. Color Management is key—as with soft proofing, you'll see only the profiles you've chosen. Click on Print One. If you'll want to print this photo again the same way, hit the Create Saved Print button in the top-right corner of the screen. ***—Debbie Grossman***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Draft Mode Printing
Print Resolution 240 ppi
Print Sharpening : Standard
Media Type : Matte
16 Bit Output
Color Management
Profile : Epson_SP3880_Hot_Press_Bright_MK_v1
Intent : Perceptual | Relative
Print Adjustment
Brightness 0
Contrast 0
When selecting a custom profile, remember to turn off color management in the Print dialog. Black Point Compensation will be used for this print.
Library | Develop | Map | Book | Slideshow | Print | Web
Page 1 of 1
Print One
Print

When to Print 16-bit

Some printers can print 16-bit. If yours doesn't, you won't see an option. If it does, check the box—even if you didn't shoot with a camera that captures 14-bit files. Depending on your conversion, you might still see a benefit.

Print Adjustment

On some systems, you'll find that prints always come out too dark or too flat. This can happen even when you're calibrated, especially if your display doesn't allow you finer brightness and contrast controls. If this is true of yours, adjust before printing, though you won't see an on-screen preview.

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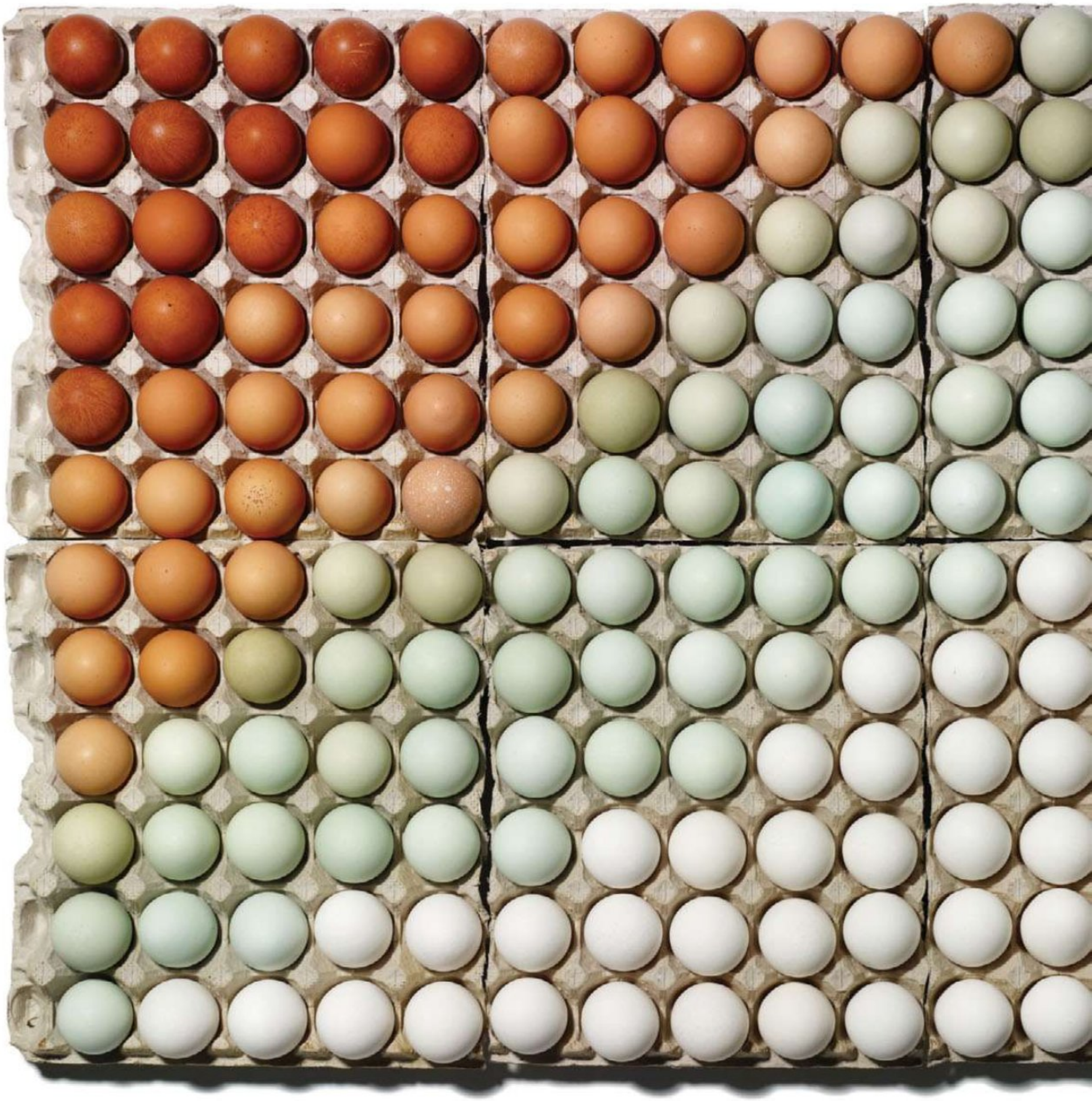


SAM KAPLAN

Good Eggs

Hone your skills by shooting concepts

LOOKING FOR for an engrossing photo project? Challenge yourself to photograph an idea. Sam Kaplan, a New York studio pro and regular *Popular Photography* contributing photographer, took on the challenge when a national

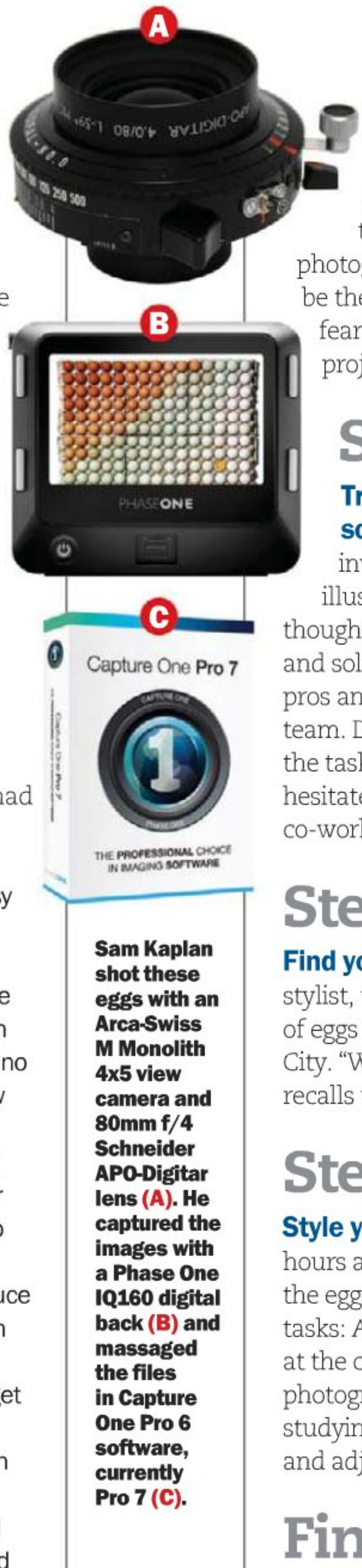
magazine accepted his pitch to visually explore the concept of diversity. His idea: To take objects that are generally understood as unvaried and uniform (eggs), and photograph them to disclose how diverse they actually are. "Eggs were almost perfect, because their repeated form looks interesting," says Kaplan. "And, while they all seem alike, they actually exist in many different colors."

The seemingly simple image that resulted took weeks of planning and nearly a half day of studio time to pull off. Kaplan fired off multiple phone calls and e-mails to the magazine's creative director, and together they translated the concept into something photographable. Kaplan then consulted with his stylist and ironed out the logistics of the shoot, which turned out to be quite complicated.

The studio challenges they had to deal with included:

- **SOURCING HEN'S EGGS** in a variety of colors. This was no easy task and involved excursions to markets all over New York City. The blue eggs, for example, came from Araucana chickens of South America and were located in Latino bodegas (small groceries) in New York's outer boroughs.
- **TRIMMING** many individual egg cartons and fitting them together to form a larger, seamless grid to present the subjects.
- **POSITIONING THE EGGS** to produce the brown-to-white gradient, from the top left to lower right. This actually took many attempts to get it the way they wanted.
- **CREATING A FOCAL POINT,** which they did by cracking one of the eggs and then positioning it (and repositioning it) until it produced the desired effect.
- **LIGHTING** to showcase the three-dimensionality of the eggs. Kaplan side-lit his set from above, so that each egg (and carton) cast a shadow—a strategy that lent a satisfying roundness to all 15 dozen subjects.

—Peter Kolonia



Sam Kaplan shot these eggs with an Arca-Swiss M Monolith 4x5 view camera and 80mm f/4 Schneider APO-Digitar lens (A). He captured the images with a Phase One IQ160 digital back (B) and massaged the files in Capture One Pro 6 software, currently Pro 7 (C).

Step 1

Pick a concept. Your challenge is to choose an idea or abstraction that you can illustrate photographically. This might be the idea of freedom, happiness, fear, love, or, as with Kaplan's project, heterogeneity.

Step 2

Translate the concept into something visual. To help invent a studio setup that illustrated his concept, Kaplan thought hard, and then consulted and solicited ideas from design pros and members of his creative team. Depending on the concept, the task can be daunting, so don't hesitate to pull creative friends and co-workers into the project.

Step 3

Find your props. For Kaplan's stylist, this meant buying hundreds of eggs from all over New York City. "We ate eggs for days," Kaplan recalls with a laugh.

Step 4

Style your image. Kaplan spent hours arranging and rearranging the eggs. One of the more tedious tasks: Aiming each egg directly at the camera, which he did by photographing the eggs, and then studying the resulting image to find and adjust "bad eggs."

Final Step

Shoot the works. Kaplan placed the cartons on white Formica and suspended a view camera directly above the set. He lit the scene with a single diffused strobe head, and later combined two bracketed exposures in Adobe Photoshop to correct for the uneven side lighting.

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Wildflower Hunt

Take heart, floral photographers—your winter doldrums are about to lift. Wildflowers are beginning to burst from the cold and darkness, and are spreading steadily throughout North America. Here are some favorite tips and techniques for capturing the flower show.

Photos and text by Tim Fitzharris

A WILDFLOWER bloom's inspiring display of form, color, and movement can energize even the most jaded of sepal snappers. Happily, you can find wildflowers just about anywhere. Every year I try to visit prime locations in North America, starting with the Arizona deserts in March and the Texas Hill Country in April. These offer spectacular opportunities, depending where rains fell the previous autumn and winter.

In May and June, you can find profuse meadow and roadside displays almost everywhere on the continent. July and August are the months for shooting subalpine species in mountainous regions of the West. My two favorite spots here are American Basin in the San Juan Mountains of Colorado and Paradise Meadows in Mount Rainier National Park.

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OPENING SPREAD
LARKSPURS AND SUNFLOWERS, WASATCH MOUNTAINS, UT
Tim Fitzharris used a 24mm f/3.5L Canon TSE tilt/shift lens to get near–far focus. Exposure in a Canon EOS 5D Mark II was 1/15 sec at f/13 through a polarizer, ISO 800.

WATER LILY, JURONG BIRD PARK, SINGAPORE
Shot at left made with a 5D Mark II and 500mm f/4 Canon EF IS lens with extension tubes; 1/400 sec at f/8 through a polarizer, ISO 640.

CALIFORNIA POPPIES, BIG SUR, CA
Fitzharris went with the 24mm tilt/shift lens with a polarizer on the 5D Mark II for the shot at left; 1/180 sec at f/11, ISO 400.

OCOTILLO, BIG BEND RANCH STATE PARK, TX
A 5D Mark II was used with a 70–200mm f/4L Canon EF IS lens for image at upper right; 1/125 sec at f/8, ISO 400.

Great shooting can be close at hand no matter where you are—zoos and botanical gardens often feature wildflowers. And tropical environments put out a steady stream of specimens year-round: I've enjoyed shooting in the Philippines, Guam, Singapore, Malayasia, Ecuador, Mexico, and Costa Rica.

Wherever you may be, these tools and techniques will help you to gather a bouquet of great images:

Focus Closer

You may not wish to fill the frame with every beautiful bloom you come upon, but it's nice to have this ability. The most efficient tool for close-ups is a zoom lens with macro capability up to 1/2 life size (1:2) or greater. This magnification will fill the frame with most of the showy species.

If your lens doesn't focus close enough, it's no burden to pack a 25mm extension tube. You can use this accessory with most any lens of normal or greater focal length to make it focus closer. Paired with a wide-angle to medium telephoto zoom lens, it allows you to cover most wildflower opportunities.

Yes, Bring the 'Pod

Given the excellent high-ISO performance of many of today's cameras, you might be tempted to leave the tripod home and just crank up the shutter speed to shoot handheld. But a tripod does more than just stabilize the camera—it's indispensable as a composing tool. It fixes camera-to-subject distance so that finely tuned points of focus (sometimes to the millimeter) will not stray from the intended picture plane. If you are trying to capture the detail of a pistil or stamen, you can set focus and be assured that these elements will be rendered sharply—hit-or-miss when shooting handheld.

The tripod also allows deliberate review of composition and exposure via live view on the LCD.

Shoot Group Portraits

I try to find three blooms that I can photograph together. If you get close enough to fill the frame and don't put the flowers in a straight line, this produces a strong composition with lots of inherent diagonal energy. Adjust your camera position to bring the pistils and stamens of all three blooms into the depth of field. If this is impossible, opt for showing only one set sharply. These sexual parts are ground

CONTINUES ON PAGE 92

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Samsung NX1000
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Samsung's mirrorless NX1000 interchangeable lens camera sports a 20.3MP CMOS sensor, a 3-" TFT LCD & records HD video at 30 FPS. Built-in Wi-Fi connectivity lets you connect to a wireless network. Save photos & videos directly to a computer or cloud service while you shoot, email them, print them wirelessly, or upload them straight to Facebook, Twitter or YouTube. You'll never have to worry about losing a great shot, running out of storage space, or remembering to bring the right cable along.

Sony Alpha NEX-5R
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PORTRAIT HOW-TO SPECIAL

LIGHTING 1-2-3

Text by Peter Kolonia

The best way to learn portrait lighting is to first master the effects achieved with a single light, then graduate to two- and three-light setups. We ask three top portraitists how to make this exciting and ultimately rewarding journey.

SATOSHI; FLASHPOINT LIGHTING EQUIPMENT COURTESY OF ADORAMA

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1 LIGHT SETUP

Start Simple

The path to great portraits begins with a single light

IF YOU'RE a novice at portraits, starting with one light (and a reflector to brighten shadows) makes a lot of sense. It contains costs and is visually simple, offering fewer shadows and hotspots to deal with. It's physically easy, with little gear to store, transport, set up, and break down. It's fast to work with and perfect for subjects who quickly grow bored or situations in which you have only minutes to get your shot.

For his portrait of the actor Martin Short (opposite), L. A. photographer Jason Madara took advantage of one light's unique expressive powers. "My main goal was to capture a quiet moment with Martin," says Madera. "Most of the images you see of him are upbeat and comical, and I wanted to project a different side of him."

Using only window light, Madara was able to match this simple lighting style to the centered, quiet, thoughtful aspect of Short that he wanted to showcase.

Single-light placement can be different for every subject and every camera angle. You have to learn how and where to place that key (i.e., main) light by doing it. One of the most common approaches is to place your key in front of, close in, and to either side of the subject. This will create strong shadows across the face that accentuate cheekbones and draw attention to your subject's eyes. The shadow you throw under the chin can also set off the face to strong effect.

A second common approach is to place your key light directly in front and slightly above the subject's face, and aim it into the eyes. You will fill in lines and wrinkles this way, and smooth out a compromised complexion.

You can do a lot with one light but, especially with indoor portraits, it often presents a challenge: contrast. As you see in Madara's portrait of Short, if you use one light indoors, it typically will produce only enough light to illuminate your subject, falling short of the background.

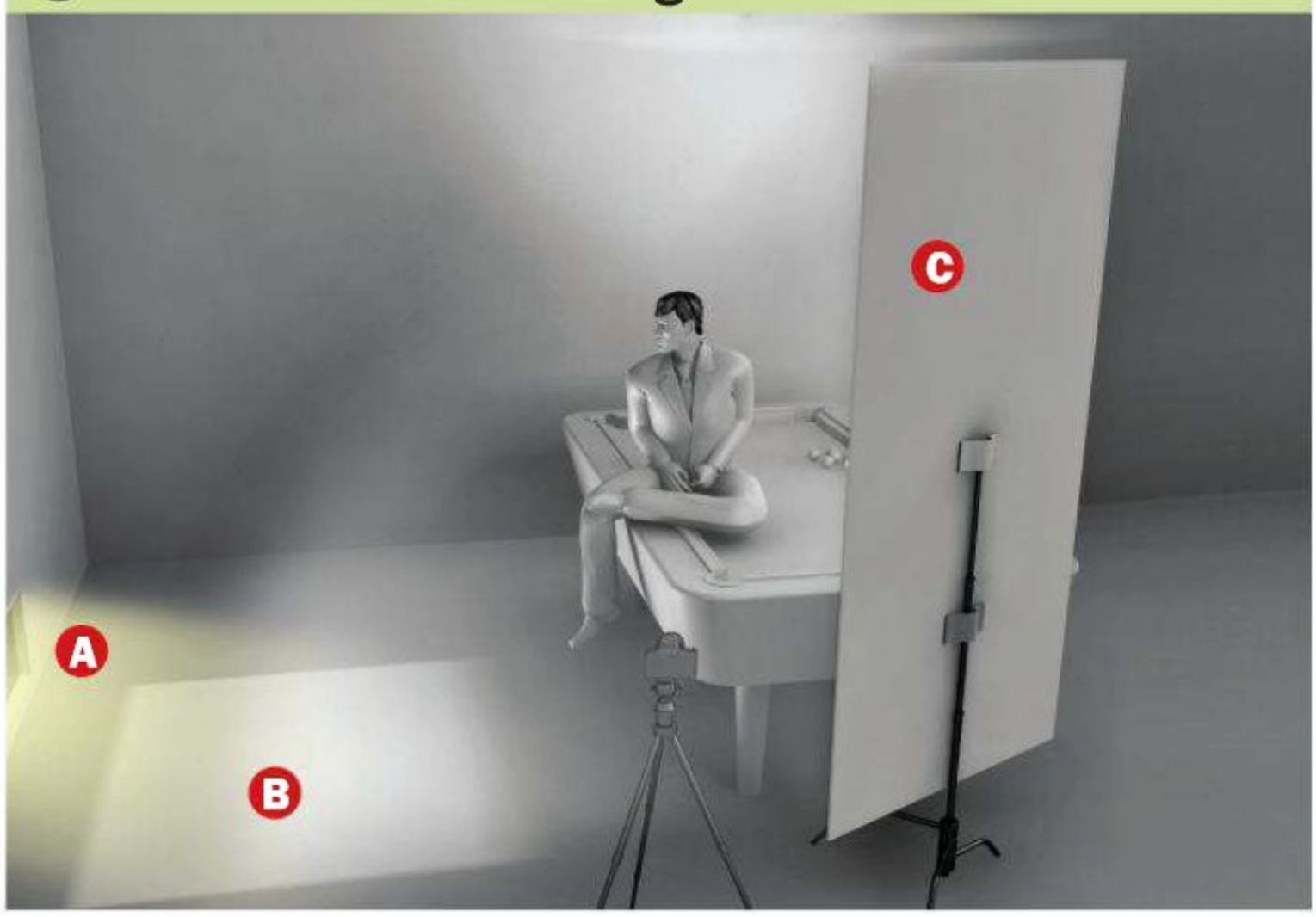
THE GEAR

▶ Jason Madara used a Canon EOS 1Ds Mark II with 24–70mm f/2.8L EF Canon zoom, exposing for 1/60 sec at f/2.8, ISO 100.

A reflector, as Madara used here, can help a little. For situations like this, Madara says, "Bring detail into your interior backgrounds by raising the ISO and lowering the shutter speed as much as possible." Shooting at 1/60 sec allowed him to record more of the beautiful room, while holding correct exposure on his strongly lit subject.

One-light portraits are a great starting point, but are only the beginning. "As my career grew, the jobs became more complex, and I started adding lights to my setups," says Madara. You will, too.

Use the sun as a single source



For his single-light portrait of comedian Martin Short, Jason Madara used the light of a small, 1.5x2.5-foot, low-placed window in the Penthouse Suite of the Fairmont Hotel in San Francisco. Direct sunlight fell through the window (A) onto the floor (B), bouncing back up into Short's face. To throw fill light onto the shadowed side of his subject and, to a lesser extent, the far wall, Madara mounted a 4x8-foot white foamcore reflector (C) on an Avenger Century light stand and placed to the camera's right, slightly outside of the view of the lens.

JASON MADARA (PORTRAIT); KRIS HOLLAND/MAFIC STUDIOS (ALL ILLUSTRATIONS)

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2

LIGHT SETUP

Add One

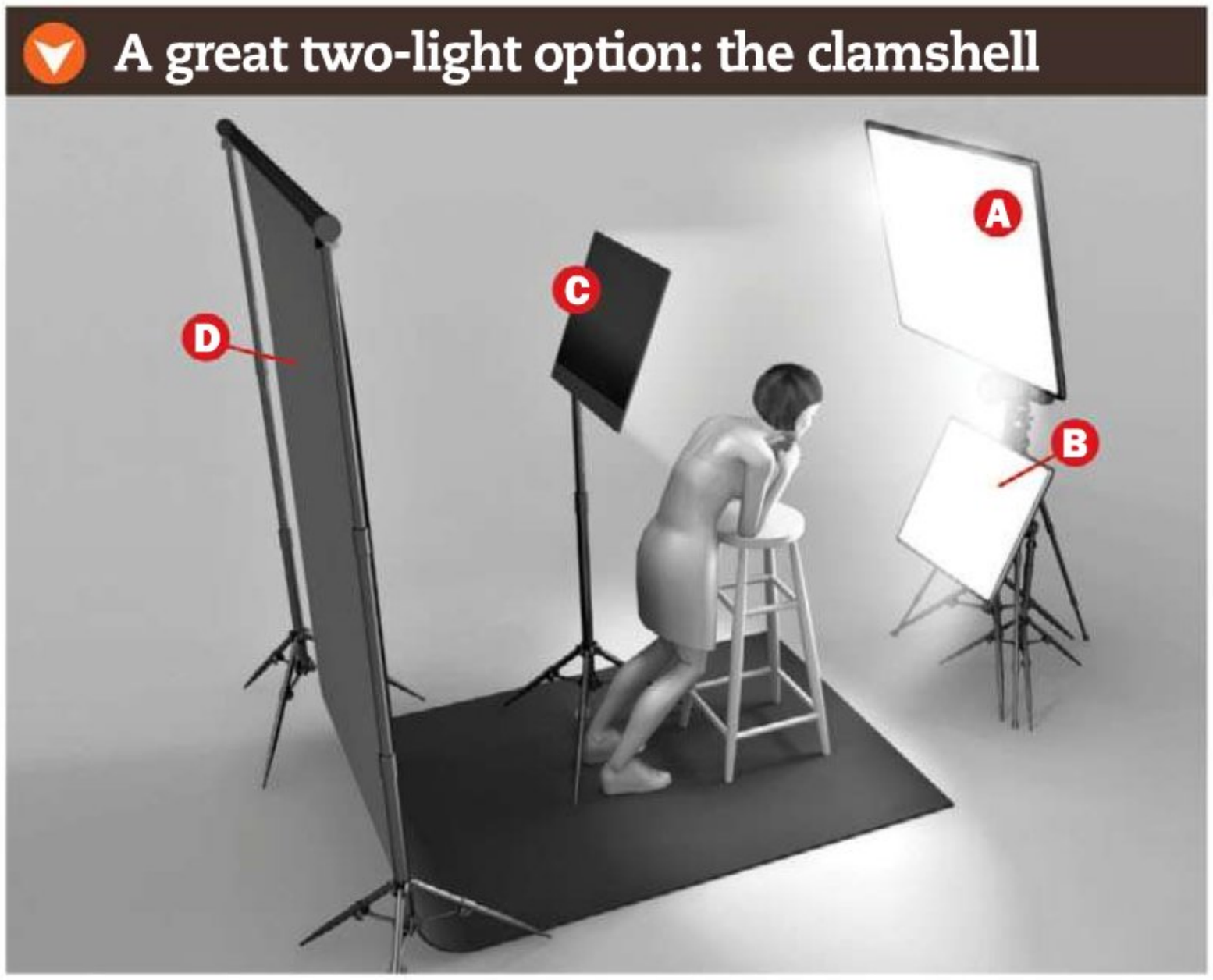
Moving from one to two lights can open up worlds

DAVID ART

THE MORE COMPLEX the circumstances, the more the constraints of working with a single light will limit your ability to make the portraits you envision. As mentioned in the previous spread, single-light setups will most likely present you with contrast challenges. Lighting with one light will also prevent you from adding subtle shaping to faces and figures.

And while a simple reflector card can boost a single light, it is often not enough, because you will be limited by placement issues. For less fill, moving the reflector back increases contrast, and for more, you can move the reflector in only as far as the frame edge. Often, there's only one sweet spot for positioning a fill reflector. So add a second light, and start by using it to sculpt and finesse the shadows.

A great two-light option: the clamshell



David Art used a classic two-light setup for this portrait: the clamshell. Starting with two softboxes (A and B) placed as close as possible to his subject, Art added a silver Lastolite Skylite reflector behind her (C) to highlight the hair and shoulders. To increase the portrait's intimate feel, he posed her against a wall of black seamless (D). He then used a 2:1 lighting ratio, with the larger, top half of the clamshell (A) twice as bright as the bottom. This helped him produce some shadows in the lower half of the portrait to set off the face.

The advantage you gain by adding a second, adjustable fill light is the ability to almost infinitely fine-tune its shaping power. Set it to a low power, and the fill (placed close for softness) will add a dark sense of mystery or drama. Conversely, turn that same light to a higher power to suggest a more sunny disposition.

David Art, a San Francisco portrait shooter, used the clamshell, a popular two-light setup, for his intimate view of R&B singer Skye.

"When you're not working with professional models, the subjects often have imperfections in their skin," he says. "Women are often concerned about that, so when I shoot them, I tell them I'm going to use my best beauty lighting. With clamshell, it's actually the truth. And it helps them to relax a little."

It's called "clamshell" because the two lights, usually in softboxes, form a V-shape that lights your subject's face from top and bottom. They form a configuration that resembles, yes, an open clamshell. "The setup fills in the shadows that define wrinkles and imperfections, so the subject has smoother skin and you have less editing later," says Art.

With this style of lighting, put your lights as close to your subject as possible, and leave little space between them. "With the lights too far apart, you lose some of the shadow-filling strength of the clamshell, especially in the middle of the frame, which is exactly where you need it for most headshots," Art says.

Keeping the lights closer to the subject will not only cast a softer light, but Art provides an added benefit: "I pay top dollar for my lights and light modifiers. I'm paying for a beautiful and consistent quality of light. The further back I place the lights, the less I benefit from these advantages."

THE GEAR

▶ For his radiant portrait of a Bay-Area R&B songstress, David Art used Profoto Acute B strobes in Creative Light softboxes. He shot with a Canon EOS 5D Mark II and 70–200mm f/2.8L IS USM zoom, exposing for 1/200 sec at f/5.6, ISO 100.

3 LIGHT SETUP

Max Out

Bring in a third (or fourth) light to make your subjects pop

WHILE A KEY light will "find" your subject, and a second light can open up or shape the shadows, two lights alone can sometimes fall short. That's why three-point lighting is probably the most common form of studio portrait lighting today. The three "points" are the key and fill lights that handle the subject, plus a third light to take on other tasks.

The most common of these is illuminating your background. Place a light immediately behind or to the side of your subject, and aim it toward the backdrop to emphasize detail, color, and texture. Its role is to add a suggestion of character, mood, or ambience to the portrait. By lighting part (but not all) of a background, you can also create shadows (or falloff) that can minimize distracting background elements.

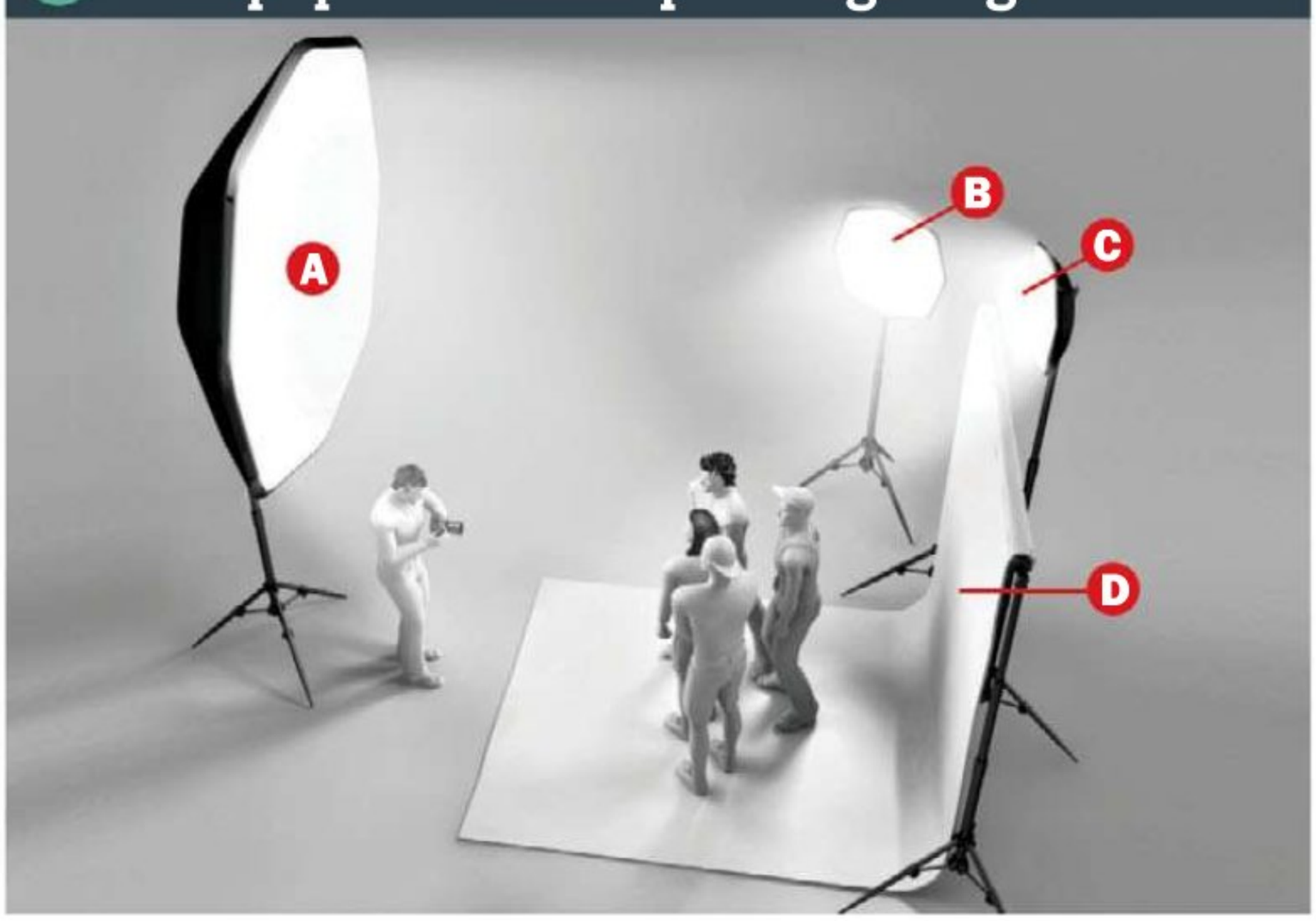
Another common task performed by a third light is rim lighting. Place a light behind and aimed at the back of your subject to outline the outer contours with white light. This will better define your subject's shape or line, and it can also separate a subject from a similarly toned background. The outline etched by a rim light can also come in handy later, helping to more easily extract a subject for compositing. Adam Elmakias used it that way for the rock band portrait above.

A third light can also serve as an accent or kicker light. With a highly-focused, soft-edge spotlight, you can subtly open up specific shadows, bring out the modeling of

THE GEAR

▶ Elmakias captured this band with a Canon EOS 5D and a Canon EF 17–40mm f/4L zoom, exposing for 1/200 sec at f/13; ISO 200.

Add pop with three-point lighting



To front-light his portrait of the rock band Pierce the Veil, Adam Elmakias used an Alien Bees B1600 monolight inside a 7-foot Photoflex Octodome softbox (A). He side- and backlit the musicians with two Alien Bees B800 monolights inside 47-inch (B) and 35-inch (C) foldable Paul C. Buff octoboxes. The side light (B) eliminated shadows on the subjects' shoulders, while the backlight (C) rimlit the group, making it easier for Elmakias to extract them from the background in post. His original background was a roll of white seamless paper (D).

ADAM ELMAKIAS

rounded shapes, or create hot spots that draw a viewer's eye.

Finally, put that third light on a boom above and slighty behind your subject and aim it down at the hair. Focused with barndoors or a snoot, it will draw attention to the color, style, and texture of the coif, as well as separate head and background.

Rock-band specialist Elmakias has yet another role for the third light: "I like my guys to pop, and the way I do it is by surrounding them by soft light from all sides to fill as many shadows as possible. The look is flat and cartoony, but is surreal and larger-than-life, too." Elmakias puts three lights on his subjects, with the main light as close as possible, for maximum softness and minimal shadows. Then he adds side and back lights, placed high, to fill in any shadows created by the key light. "Keep in mind that every time you add a light, it means more things can go wrong," he warns.

For a shot like this, he poses and lights each musician individually. "I start with one person. Pose him and test the lights, then add the next and test the lights again."

"Ninety percent of my pictures with multiple lights don't work" he says. "Every time a subject moves, there's a new shadow to deal with."

But the ones that do work? Killer.

The Gear You Need

For portraitists of all levels of expertise, studio and location gear divides itself in three convenient groups: Light sources, light modifiers, and studio hardware or "grip."

Light Sources

If you've yet to invest in portrait lighting, you have five source options to choose from, and your most common type of portrait subject will dictate your choice.

Strobes: For most scenarios, strobe lights make sense. They're cool and fire instantaneously to freeze subject and camera movement. (They're practically a must for child and pet portraits.)

Ring lights: Photographers who do glamor portraits like the distinctive halo-like shadow that a light around the lens can cast.

LEDs: Videographers will use LED panels because they're also cool and can double as still lights.

Compact fluorescents: Similar to LEDs in temperature and quality of light, CFLs are much less expensive.

Tungsten lights: Old-school hot lights can heat up a studio and pop circuit breakers, but can also be used for video and are relatively inexpensive.

(A) The Flashpoint DG600 300 WS studio strobe ($200, direct, from Adorama) works with all Flashpoint's studio accessories. (B) Ikan's IB 500 Dual Color LED studio light ($475 street) changes color temp sans gels. (C) Westcott's Ice Light LED wand ($500, street) is a great accent light. (D) Interfit's Super Cool-lite 9 MKII compact fluorescent light ($290, street) is soft enough to let you forgo a softbox. (E) Quantum Instruments' Omicron OM3 LED Ring Light ($700, street) offers TTL exposure control with adapters.

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Light Modifiers

These tools attach to the front of your light source. They divide into two camps, those that soften or diffuse the source and those that harden or focus it.

Softboxes: These light softeners are available in sizes from small to massive, and usually attach to the light source with the help of something called a speed ring.

Umbrellas: In a many sizes, these usually attach with an adapter that accepts their shafts. They're inexpensive, set up faster than a softbox, and last forever.

Beauty dishes: These cast a light that's slightly harder and more directional than a softbox.

Strip lights: Narrow, rectangular (not square) softboxes, they're well-suited for throwing backlit outlines around full- or half-length figures.

Parabolic reflectors: They're often sold with the source, and are most often used to cast a hard light.

Barndoors: These four-sided tools feature folding flaps (or doors) used to focus and direct light.

Snoots: Conical attachments that focus strobe output (usually) with a spotlight's intensity.

The Calumet 22-inch beauty dish (A) has an adjustable center reflector for fine-tuning softness ($100, direct). F.J. Westcott's Bruce Dorn Asymmetrical Strip Bank (B) features a 3-stop falloff from top to bottom for auto-vignetted portraits ($350, street). Photoflex StarFlash Snoot kit (C) has provisions for mounting grid and gel attachments ($42, street).

Studio Grip

Hardware, also known as grip, forms the physical infrastructure of most portrait studios and, if well-chosen, can last a lifetime.

Background stands: Available in many versions that range from simple poles to elaborate systems that can hold multiple backdrops and switch between them at the touch of a button.

Light stands: The best are air cushioned, with simple thumb locks. If you're into location portraits, shop for lightweight stands that are compact when collapsed.

Clamps: Start with four or five A (for alligator) clamps, and then branch out into specialized tools like suction clamps or the Manfrotto Super Clamp shown here.

Lighting cases: These can be hard-sided for storage and travel of fragile lights, or softsided for more indestructible gear such as light- and background stands.

Tripods: Have two for your camera—a solid one for shooting adults in predetermined compositions (i.e., tight headshots), and a lighter one for location work and in-studio shots of actively moving kids.

The Savage Port-a-Stand (A) is sold in kits with backgrounds ($164, street), and is equally well-suited to studio or location portraits. Lowel's excellently made UniTO light stand (B) folds to 21.5 inches, weighs 3 pounds, and will last forever ($57, street). The Manfrotto Super Clamp (C) holds anything ($27, street).

GEAR TIPS

- **Consider renting equipment until you know what you want and can afford it.**
- **Trade shows are great for getting hands-on experience with gear.**
- **For gear you will use for years, spend top dollar.**

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CHRIS GARRISON

PICTURE PROFIT

Want to make some money with your camera? There are plenty of opportunities for bringing in a few extra bucks while doing what you love—and you won't have to quit your day job. Here's how.

By Theano Nikitas

SHOOTING SPORTS Chris Garrison, who started out shooting part-time and later turned pro, makes money photographing the extreme events he loves.

YOU'VE INVESTED in camera gear and you love taking pictures, but you're not interested in a full-time photography career, especially when pros these days don't exactly have it easy. Still, you can earn a little extra with your camera—if you're willing to put in the time and effort—and keep your weekly paycheck, too. Whether you want to shoot weddings or portraits, sell prints or stock, or capture local sporting events, here's the skinny on getting started.

Try Weddings

Wedding photography is almost recession-proof and, since weddings are seasonal and often on weekends, it's relatively easy to shoot part-time. Freelance wedding photographer and writer Nathan Chandler (40nightscreative.com) splits his time between shooting and writing, and explains that his start in wedding photography began when family and friends saw his landscapes and casual portraits and assumed he could photograph nuptials, too. After about five years, Chandler was enjoying wedding photography enough that he began actively trying to get wedding jobs. The Nebraska-based photographer now shoots about 20 each season.

Seattle-based Chloe Ramirez (chloephotographygallery.com) started out as a second shooter for other wedding photographers. "That gave me the background and confidence to start photographing weddings on my own," says Ramirez, adding that she didn't go out on her own until after a solid year of second shooting.

She also suggests styling your own wedding shoot for portfolio images by working with local vendors—make-up artists, venues, etc.—and exchanging pictures for their services. From there, send the final images to a wedding blog, says Ramirez. "If it gets picked up, that gives you and the vendors exposure for your businesses." And, she adds, "Ask vendors if you can refer your brides and grooms; they will most likely return the favor and that will get you more inquiries."

During the three-to-four month wedding season, Ramirez shoots full-time, accepting up to four weddings per month, and puts her three-year-old daughter in

daycare two days a week so she can concentrate on editing. "That way, when I am home with my family, I am present and not trying to juggle both [family and work]."

Take Portraits

Child and family photography is a growing market and a realistic—and often fun—option for photographers who want to earn a little money on the side.

Amy Grace (abeautifullifephoto.com), a parent of two and an active member of the family photo website *Little Bellows* (www.littlebellows.com), got her first DSLR two years ago. She began by shooting personal images, spending a lot of time photographing her children as well as friends and family. About a year ago, she got her first paid job and found that the "wisdom, patience, and attentiveness" learned from photographing her own children was "invaluable" for working with other families. Grace currently takes limited sessions—preferring no more than one client a month—so she can care for her children, but expects this to change in the future.

She posts weekly on *Little Bellows* and writes a column called "Motherhood With a Camera." She says, "The weekly posts have increased my audience; the feedback and connections from readers are inspiring and encouraging, and it confirms that there is so much depth, talent, and purpose behind the often-dreaded moniker MWAC [Mother With a Camera]."

In addition to the inquiries from *Little Bellows* readers, Grace finds that her clients come to her via word of mouth—whether locally or via social media like Facebook.

Photographing since high school, Lora Swinson (www.swinsonstudios.com) only started shooting portraits when her oldest son was born. Soon after, she asked everyone she knew if she could photograph them to get experience. "My biggest tip for anyone starting out is to ask your family members and friends for their help. Word-of-mouth is your biggest tool in this industry." But, she cautions, "be honest and open about your skill level and what they should expect."

Sell Prints

Selling your images—whether via galleries, online, or at art fairs—can be a challenge, but it isn't impossible. Landscape and fine-art photographer Derek Jecxz combined research, persistence, and a portfolio of extraordinary images to sell his work. He entered competitions from "reputable" museums and galleries, which helped him get into other galleries. After a couple of years, licensing company Bruce McGaw Graphics approached him with a contract to reproduce and distribute his work.

New York City-based Deborah Gilbert makes hand-colored silver gelatin prints, and she has traveled far and wide to sell her work at art fairs. While she'd once do as many as 43 shows in a single year, she now concentrates on those in the Northeast. She suggests that newcomers start small with local shows where tables rent for for $20-$25. Larger shows may cost up to $2,000.

Gilbert points out that you won't necessarily make more money at a higher-level show, especially after deducting fees. "You can make more at the smaller local shows at the Kiwanis club," she says. She mixes both local and higher-end shows and recommends that if you're traveling, pick locations where you have family or friends that you can stay with to cut down on hotel expenses.

Gilbert offers framed, original hand-colored photos for around $500, but also sells smaller, matted reproductions that cost less. Her matted works are standard sizes, so buyers won't need a custom frame.

Both Jecxz and Gilbert caution photographers to do their research before handing over money to any online site since there are some organizations that really don't deliver useful—if any—services. And to find lists of national art shows, Gilbert suggests subscribing to *Sunshine Artist* magazine.

CONTINUES ON PAGE 94

Working for Free

Is it worth it to shoot without pay?

It's a hot topic among both new and established photographers. Many shooters argue that working for free or for below market rates devalues the profession and makes it more difficult to increase your rates as you gain experience.

Nathan Chandler started out shooting weddings free because he felt he "wasn't qualified to call [him]self a wedding photographer," but now charges.

Family shooter Lora Swinson notes that you shouldn't "feel like you have to do everything for free—your time is worth it and if you don't put a value on it, no one else will." She suggests letting people know that "these are your portfolio building rates and in time they will be raised."

Bartering is another option. Cliff Mautner, for example, photographs his dentist's special family events, such as a child's communion or the family portrait on Easter. But Mautner cautions that "I'm at the level in my profession where he [the dentist] is in his. The mutual respect for one another's skills has to be there; otherwise it's not going to work."

CLOCKWISE FROM TOP

WEDDINGS HALF THE TIME **Nathan Chandler makes his money both as a writer and a wedding shooter; this was his favorite from a 2010 Iowa wedding.**

NOT THE AVERAGE MWAC **Combining parenting and photography, Amy Grace posts weekly to the website *Little Bellows*. She took this photo of her son on his second birthday.**

FAMILY PICTURES **Clickin' Moms, a website for mothers (and anyone else) going pro, has been a valuable resource for Lora Swinson.**

A FORMER SECOND SHOOTER **Chloe Ramirez learned by working for other wedding pros for a year before going out on her own.**

CLOCKWISE FROM TOP: NATHAN CHANDLER; AMY GRACE; LORA SWINSON; CHLOE RAMIREZ

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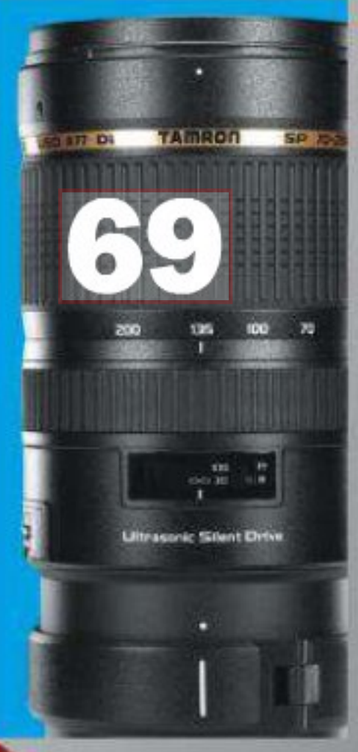
LAB

AUTHORITATIVE TESTS, REVIEWS, AND BUYING ADVICE

FULL TESTS: SONY CYBER-SHOT RX1 & TAMRON 70–200MM F/2.8 DI VC

66



69

TEST: CANON EF 24MM F/2.8 IS USM

70

DSLR TEST

FRAME UP

Canon's bargain full-framer gets it right

EVER SINCE the first full-frame DSLR hit the market, photographers have been begging for less expensive options for large-sensor image capture. Canon's current answer? The 20.2MP EOS 6D ($2,099, street, body only). While that's still a hefty chunk of change for most people, it's also $1,400 less than Canon's EOS 5D Mark III ($3,499, street, body only). When we tested competitor Nikon's D600 in our December 2012 issue, it

SATOSHI

CANON EOS 6D

20.2MP full-frame CMOS sensor
1920x1080p30 video capture
Sensitivity up to ISO 102,400
Built-in Wi-Fi for image transfer and camera control
$2,099, street

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AMATEUR PRO

LINZEE LICHTMAN (LCD IMAGE)

proved a very capable camera that could easily serve as a backup body for a pro or a main camera for a photographer just getting into the full-frame world. Does Canon's 6D deserve similar accolades?

In the Test Lab

Like the 5D Mark III before it, the 6D keeps noise well under control throughout most of its wide sensitivity range. This, along with serving up accurate colors and an admirable amount of resolving power, combine to earn the 6D an overall image quality rating of Excellent from the lowest sensitivity of ISO 50 (Canon calls it Lo) all the way up to ISO 6400. If you began your journey in photography during the film era, this means that you can get top-notch images at any of the ISOs that were available to you when you started shooting.

Even though it has fewer pixels than the 5D Mark III or Nikon D600, the 6D still easily earned an Excellent rating in our resolution test with 2625 lines per picture height at ISO 50. More impressive was its ability to keep that resolving power high as the sensitivity increases. By ISO 800, the 6D had dropped only 50 lines to 2575. It then continues to hold most of that, dropping to 2550 lines by ISO 6400. After ISO 6400, resolution takes a nosedive with 2190 lines at ISO 12,800, then 2120 at ISO 25,600, and 1800 at ISO 102,400.

Color accuracy also easily snagged an Excellent rating with an average Delta E of 7.3. Though it's rare to find a DSLR these days that doesn't ace this test, Canon

CANON EOS 6D

WHAT'S HOT

Excellent image quality to ISO 6400.

WHAT'S NOT

No pop-up flash; single SD card slot.

WHO IT'S FOR

Photographers looking for Canon's least expensive full-frame body.

deserves kudos for maintaining its good track record in this critical area of imaging.

In our noise test, the 6D kept that pesky annoyance to levels commensurate with a Low or better rating all the way up to ISO 12,800. The only reason the image quality score didn't reach that high up to this sensitivity is because of that sharp drop-off in resolution that we just mentioned. Interestingly, a similar drop-off occured in the 5D Mark III after ISO 12,800. Nikon's D600 outresolves both the 6D and 5D Mark III, but holds noise to Low or better levels only up to ISO 3200. Meanwhile, that camera tops out at ISO 25,600, while both of the Canons mentioned here top out at ISO 102,400.

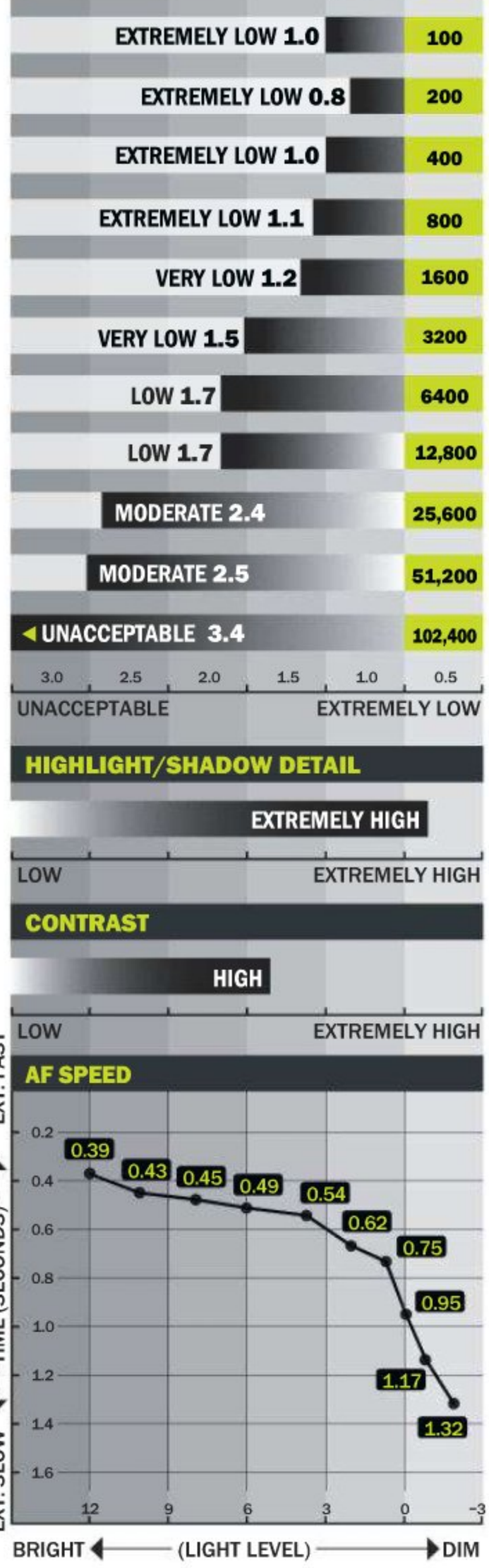
If there's one area where you'll notice the difference between the 6D and 5D Mark III, it's in autofocus. It's not that the 6D is lacking in any big way, but the 5D Mark III excels in this area with a 61-point system made for tracking fast-moving subjects. The tough part is that shooters who are used to Canon's EOS 7D

CONTINUES ON PAGE 84

In addition to an automatic HDR mode, the 6D can also shoot multiple exposures of up to nine frames.

Canon did a good job of cutting costs in the right places to create a camera that is a pleasure to use.

TEST RESULTS



AMATEUR ▲ PRO

Tony Sony

THE WORLD'S FIRST FULL-FRAME DIGITAL COMPACT

EVERY ONCE in a long while a camera comes along that is at once both a complete surprise and exactly what everyone wants to see. Such is Sony's 24.3MP Cyber-shot RX1 ($2,798, street). Our jaws dropped when Sony first told us about it prior to the Photokina trade fair in Cologne, Germany, last fall.

With its full-frame CMOS sensor, it promised to be the topmost gun of the large-sensored premium compacts that have managed to survive in a world awash in cellphone cameras. It also puts an end to the perennial question: Why doesn't someone just put a full-frame sensor in a small, pocketable camera?

The answer is that it just isn't that simple. For utility's sake, Sony had to use a lens that is on the wide side—in this case a 35mm. For depth-of-field control and low-light prowess, the engineers also had to make it a fast lens. That combination leads to large glass. So Sony opted for a fixed lens to reduce bulk—

SONY CYBER-SHOT RX1
WHAT'S HOT
Full-frame sensor with Excellent resolution.
WHAT'S NOT
It really does cost nearly $2,800.
WHO IT'S FOR
Photographers who want to look cool or are desperate for a full-frame compact.

PHILIP RYAN (LCD IMAGE)

Function button

Sensor plane indicator

Exposure compensation dial

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interchangeable lenses need bigger external barrels.

If you look at the position of the sensor plane indicated in the photo at bottom left, you'll see that it is very far toward the back of the RX1's body. Consider, too, that the lens extends more than halfway into the camera, placing the rear element only a few millimeters in front of the sensor. It was undoubtedly a huge challenge to design the lens.

Add to that the problem of managing heat in such a small body and putting it all together with an elegant design commensurate with the unavoidably high price tag, and you've got more complexity than most companies would want to deal with. In this case, Sony clearly wanted to show off that the company is serious—very serious—about cameras.

In the Test Lab

With its large sensor, high pixel count, and a fast purpose-built lens, we weren't surprised to see the RX1 get high marks in our lab tests. Its biggest drawback was in color accuracy—an area in which many compact cameras don't excel. This isn't to say that the colors weren't pleasing. They just weren't as accurate as we've become accustomed to in DSLRs and ILCs. Noise also proved troublesome, but it's not easy to keep temperatures down in a compact, and excess heat can lead to more noisy images.

Overall image quality earned an Extremely High rating from ISO 50 through ISO 200. With 2870 lines per picture height in our resolution test, there was plenty of resolving power for an Excellent rating. From there, the Extremely High rating in Color accuracy (9.5 average Delta E) sent the image quality rating one level down from our top honors.

In our noise tests, the RX1 wasn't clean enough for an Extremely Low rating at any ISO. Instead, it started out with a Very Low rating at ISO 50 and rose to Moderately Low by ISO 400. Impressively, Sony held noise to acceptable levels all the way up to ISO 3200. Even at ISO 25,600, the RX1 showed a standard deviation of 4.8—a better result than Nikon's D800, though that DSLR far outresolves the RX1 at lower sensitivities.

Even though the resolution dropped as the sensitivity increased, the camera always managed to resolve enough for an Excellent rating by our standards. At ISO 400, the RX1 dropped to 2790 lines; by ISO 3200, to 2640 lines. At the camera's highest ISO, 25,600, you still get 2510 lines. The noise and loss of detail at this setting may make images unusable for some photographers, but others might not mind. We generally felt safe shooting at up to ISO 3200, where the noise wasn't too prominent and the loss of resolution was not much more than 200 lines below the camera's peak.

The thing to remember here is that this is a compact camera. Sony's own RX100 ($648, street), while costing thousands of dollars less, maxes out at 2270 lines per picture height and reaches Unacceptable noise levels by ISO 800. The RX1 shows the extremes of what is possible in a camera that can fit comfortably in a coat pocket.

In the Field

With a solid-feeling metal body that tries to look neither retro nor futuristic, the RX1 carries an easy charm and an underlying sense of sophistication. The control system, with its aperture ring on the lens barrel, relies on two-handed operation.

In addition to having a full-frame sensor inside, the Cyber-shot RX1 can also capture 14-bit RAW images, allowing for more flexibility in controlling highlights and shadows.

TEST RESULTS

We're fine with this, since it's always better to steady the camera with two hands, but the grip is anemic, to say the least. It benefits from textured rubber, making it relatively secure in the hand, but Sony could take it a step further as Olympus does in its PL line of ILCs. The optional TGA-1 thumb grip ($250, street) remained on our test sample for the majority of our field testing.

This is problematic because, while the grip does have a cold shoe on which you can mount the optional FDA-V1 optical finder ($598, street), you can't use it in conjunction with the optional FDA-EVM1K ($448, street) electronic OLED finder. The optical finder is lovely, but we found ourselves missing the information available in the OLED finder, as well as the ability to customize the display with overlays of histograms or the electronic level. We're hoping Sony will devise a thumb grip that retains the contacts for the Multi Interface Shoe.

Changing settings while shooting is relatively painless, thanks to the function menu. A quick press of the Fn button brings up all the settings you'll likely need. We appreciated being able to change ISO by simply turning the rear control wheel while ISO was highlighted in the function menu. Sometimes manufacturers make you select with another button press before changing this setting, which only slows things down.

The dedicated exposure-compensation dial is a classy feature. Not only can you see if any compensation will be applied without turning the camera on, you can also count clicks to apply compensation while using the optical finder. The downside is that exposure comp doesn't go beyond +/– 3EV. While this is commonplace in compact cameras and entry-level DSLRs, we always like to see more.

Street shooters will appreciate the threaded shutter release. Not only is a mechanical cable release a great way to trigger the shutter without tipping people off that you're shooting, it is also less expensive than most electronic cable releases (welcome relief after springing for the thumb grip and optical finder.) You might also want to keep some extra cash around to get the optional LHP-1 lenshood ($178, street). This mounts on a bayonet found neatly recessed into the front of the lens barrel.

In addition to all the normal shooting functions, Sony includes its array of auto modes, some of which are useful as well as fun. Sweep Panorama makes wide vistas easy to capture. Handheld Twilight combines multiple exposures to minimize noise. Auto HDR merges three shots into one high-dynamic-range image without the need for a computer. The results are nice, and you can select how much of a bracket you want, but dedicated HDR software still yields the best possible results for these types of images.

The RX1 can capture video at up to 1920x1080p60 thanks to the inclusion of AVCHD progressive recording. Footage we shot looked fine for a compact camera.

If you like the extremely close focusing you would normally find in Sony's compact cameras, you should know that the RX1 can't match it. The physical limitations that go along with the large sensor prohibit it. However, we found that it got close enough for most of the shots we wanted to do, once we switched to the close-focusing range that spans about 8 to 14 inches.

The Bottom Line

It's hard to compare the Sony RX1 to other cameras because it really is unique. As such, it carries a hefty price tag.

For significantly less money, you could opt for the Sony Alpha NEX-7 ($1,198, street, body only) paired with the new E-mount 35mm f/1.8 OSS lens ($448, street). You'd end up with the same pixel count (though notably less measured resolution in our tests), better noise performance, and better color accuracy. You'd also have a built-in OLED EVF and the versatility of swappable lenses.

But you wouldn't have the world's first full-frame compact. And when it comes to a camera like this, you may find that even more alluring. ***—Philip Ryan***

We're fans of the RX1's control system, but the ring that switches from regular to close focusing took a bit of time to get used to. Once we did, though, this proved a great way to focus on subjects as close as 8 inches from the camera.

SPECIFICATIONS

IMAGING: 24.3MP effective, full-frame CMOS sensor captures 6000x4000-pixel images with 14 bits/color in RAW mode.

STORAGE: SD/Memory Stick Pro slot stores JPEG, ARW RAW, and RAW + JPEG files.

BURST RATE: Full-sized JPEGs (Extra Fine mode), up to 20 shots at 2.5 fps, up to 14 shots at 5 fps (speed priority); RAW (14-bit), up to 14 shots at 2.5 fps, up to 12 shots at 5 fps using an SDHC UHS-I card.

AF SYSTEM: TTL contrast detection with 25-point multi, centerweighted, or flexible spot; face detection and tracking.

SHUTTER SPEEDS: 1/4000 to 30 sec, plus B (1/3-EV increments) at f/5.6 or smaller; up to 1/3200 sec at f/4; to 1/2000 sec at f/2.8.

METERING: TTL metering with 1200-zone multi-segment (evaluative), centerweighted, spot (size of spot not specified).

ISO RANGE: Standard, ISO 100–25,600 (in 1/3-EV increments); Expanded, ISO 50–25,600.

VIDEO: Records at 1920x1080p at up to 60 fps in AVCHD v. 2.0; at 1440x1080p at 30 fps in MPEG-4 MOV format; built-in stereo microphone; stereo mic input.

FLASH: Built-in pop-up; GN 20 (feet); Multi Interface Shoe for dedicated flash or other accessories; flash sync to 1/4000 sec.

LENS: Carl Zeiss Sonnar T* 35mm f/2 with 8 elements in 7 groups (3 aspherical elements); 9–bladed aperture; minimum focusing 12 inches or 8 inches (macro).

LCD: 3-inch TFT with 1,229,000-dot resolution; 5-step brightness adjustment.

OUTPUT: USB 2.0, micro HDMI video, composite video, analog audio.

BATTERY: Rechargeable NP-BX1 Li-ion, CIPA rating 220 shots (with LCD set to maximum brightness) or 270 (with LCD set to middle brightness).

SIZE/WEIGHT: 4.5x2.6x2.8 in., 1.1 lb with a card and battery.

STREET PRICE: $2,798.

INFO: www.sonystyle.com

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AMATEUR PRO

Tele Tool

TAMRON STABILIZES A PRO FAVORITE

AMONG PROS, image-stabilized 70–200mm f/2.8 full-frame zooms have become must-own glass. They're in Canon ($2,499, street), Nikon ($2,397), Sigma ($1,399), and now Tamron's catalogs ($1,499), and we see them at weddings, sporting events, in portrait studios, and in backpacks. Tamron's version includes four elements of low-dispersion and one of extra low-dispersion glass. Another boast: Its Vibration Control has been redesigned for better performance.

Not for the faint of wrist, this 3.32 pounder is actually several ounces lighter and about a quarter-inch shorter than the competition. Its nonrotating front ring is nice for lens-mounted filters; the 130-degree manual focus turn is just about perfect (although at a little over a half inch, the MF ring is small); the build is robust, with rubber cowling at the lens mount. There's no depth-of-field scale, though. (The comparable Sigma has two.)

CONTINUES ON PAGE 88

TAMRON 70–200MM F/2.8 DI VC USD

WHAT'S HOT

Minimal distortion and great stabilization.

WHAT'S NOT

Slightly less sharp at 200mm.

WHO IT'S FOR

Pros wanting an extremely well-constructed, high-speed utility zoom with stabilization.

SPECIFICATIONS

70–200MM (68.68–196.11mm tested), f/2.8 (f/2.70 tested), 23 elements in 17 groups. Focus ring turns 130 degrees. Zoom ring turns 70 degrees. Focal length marked at 70-, 100-, 135-, and 200mm.
DIAGONAL VIEW ANGLE: 34–12 degrees.
WEIGHT: 3.32 lbs. **FILTER SIZE:** 77mm.
MOUNTS: Canon AF, Nikon AF, Sony AF.
INCLUDED: Lenshood, tripod collar.
STREET PRICE: $1,499.
WEBSITE: tamron-usa.com

TEST RESULTS

DISTORTION: At 70mm, 0.11% (Slight) barrel. At 135mm, 0.09% (Imperceptible) pincushion. At 200mm, 0.18% (Slight) pincushion.
LIGHT FALLOFF: Gone by f/4 at three tested focal lengths.
CLOSE-FOCUS DISTANCE: 45.83 inches.
MAXIMUM MAGNIFICATION RATIO: At 70mm, 1:13.50. At 135mm, 1:8.36. At 200mm, 1:6.75.
IMAGE STABILIZATION: Average of 3.5 stops for three unique users.

SATOSHI

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Strobist® Kit

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AMATEUR PRO

Wide One

WORLD'S WIDEST STABILIZED PRIME

THE WIDEST of Canon's recent barrage of wide-angle, full-frame prime lenses, this 24mm f/2.8 IS USM ($807, street)—along with the 28mm f/2.8, and new 35mm f/2—forms a three-tiered team, notable for compact proportions, reasonable pricing, and image stabilization across the board. Significantly lighter and more compact than Canon's comparable nonstabilized f/1.4 primes, all three newcomers are also far less expensive.

This 24mm f/2.8 replaces Canon's nonstabilized 24mm f/2.8 EF, which was introduced in November 1988, just over a year after the birth of the company's now-venerable EOS system. It boasts a molded-glass aspherical rear lens element for edge-to-edge contrast and sharpness, full-time manual focus, and a number of advances over the old lens, including Canon's sophisticated ring-type USM focusing motor and the aforementioned stabilization.

At just over 10 ounces, this new prime is pleasingly light and compact, and takes 58mm filters. Its attractive matte-black surfacing is adorned with faint stippling. There's a welcome depth-of-field scale for f/11 through f/22, but you have to pay extra if you want a lens shade—and we highly recommend the use of one for ultrawides like this one.

Autofocus action is extremely fast and quiet, and manual focus has a smooth, even, well-damped turn with a generous 110-degree radius. In the field, the lens feels and handles like a classic 50mm f/1.8, albeit twice as wide.

On our optical bench in the Popular Photography Test Lab, the lens produced Excellent SQF results for sharpness and contrast that were just slightly below those of Canon's pro-level 24mm f/1.4L.

Our distortion tests using DxO Analyzer 4.1 found Visible (0.33%) barreling—less impressive than the f/1.4L, which showed Slight (0.16%) barrel distortion. While these numbers might seem slightly damning, the 24mm f/2.8 matched or did considerably better than most of today's popular 24–70mm f/2.8 zooms at 24mm by most of the usual optical standards.

This lens stands out as far less bulky and much less costly than higher-speed options. Also, since wide-angle images appear sharper by their nature, the added IS makes hand-holding at truly slow shutter speeds a realilty; our tests found an extra 2 stops of leeway. Using the usual reciprocal-of-the-focal-length rule, this means that average shooters should be able to shoot at 1/6 sec rather than 1/25 and attain acceptably sharp pictures of stationary subjects.

With its compact, perfect-for-travel size, responsiveness, and relatively low price, Canon's stabilized 24mm f/2.8 —great for low-light and tight interiors—should make a nice high-speed, wide-angle option for amateurs and pros alike. Even without a lens shade.

—Julia Silber

This complete makeover of Canon's 24mm f/2.8 from 1988 adds image stabilization, a molded-glass aspheric element for edge-to-edge sharpness, and the updated USM focusing motor. Owners of the older lens should consider upgrading.

SPECIFICATIONS

24MM (25.55mm tested), f/2.8 (f/2.96 tested), 11 elements in 9 groups. Focus ring turns 110 degrees.
DIAGONAL VIEW ANGLE: 84 degrees.
WEIGHT: 0.66 lbs. **FILTER SIZE:** 58mm.
MOUNTS: Canon AF.
STREET PRICE: $807.
WEBSITE: canonusa.com

TEST RESULTS

DISTORTION: 0.33% (Visible) barrel.
LIGHT FALLOFF: Gone by f/5.6.
CLOSE-FOCUSING DISTANCE: 7.63 inches.
MAXIMUM MAGNIFICATION RATIO: 1:3.91.
IMAGE STABILIZATION: 2 stops.

CANON EF 24MM F/2.8 IS USM

WHAT'S HOT
Fast, responsive, compact, convenient.

WHAT'S NOT
Lens shade not included.

WHO IT'S FOR
Budget-bound Canoneers who crave what a fast wide-angle prime can do.

SATOSHI

SUBJECTIVE QUALITY FACTOR

Our standard lens test, SQF rates sharpness by print size

24 MM

Size	5x7	8x10	11x14	16x20	20x24
2.8	96.1	94.9	92.0	86.2	79.1
4.0	96.3	95.2	92.5	87.1	80.6
5.6	96.4	95.3	92.6	87.3	80.8
8.0	96.7	95.7	93.3	88.7	83.2
11.0	96.2	95.1	92.3	86.8	80.1
16.0	96.0	94.8	91.9	86.2	79.2
22.0	95.3	93.9	90.4	83.5	74.8

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- 10fps Continuous Capture
- 5x Optical Zoom • 4x Digital Zoom
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- RAW & JPEG Capture • 12800 ISO

*#CAPSG15**

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16GB	29.95	37.95	69.95	—	—	21.95	47.95	69.95	57.50	114.50	47.95	57.95	78.50	—
32GB	58.95	66.95	114.95	—	—	47.95	69.95	112.68	98.95	209.95	—	94.95	147.50	—
64GB	112.95	142.95	269.95	—	—	—	—	212.50	184.95	414.95	—	179.00	349.95	—
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32GB	—	79.95

SDXC-UHS-1 Extended Capacity

	Delkin		Lexar			Sandisk		
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64GB	104.95	139.95	59.95	91.95	149.95	64.95	87.95	132.95
128GB	194.50	—	—	179.95	259.95	—	184.95	—
256GB	—	—	—	399.95	**Note:** Not all devices support SDXC cards			

SDHC-UHS-1 Ultra High Speed

	Delkin		Lexar			Sandisk		Panasonic		Sony
	600x	633x	Class 10 200x	Class 10 400x	Class 10 600x	Ultra 30 MBs	Extreme Pro 90 MBs	Gold 25 MBs	Pro Class 10	Pro Class 10
8GB	17.95	28.95	—	14.95	—	10.42	20.95	27.50	54.95	17.95
16GB	29.95	45.95	17.50	24.95	38.95	14.95	38.95	29.95	99.95	29.95
32GB	45.95	91.95	29.95	39.95	68.95	36.50	64.95	64.95	146.37	52.41

SD HC Secure Digital High Capacity

	Delkin		Kingston			Lexar		Sandisk				Sony	
	Pro Class 6	Pro Class 10	Standard Class 4	Ultimate X Class 10 100x	Micro Class 4 Multi Kit	Std Class 4	Platinum II 100x	Std Class 4	Ultra Class 6	Extreme Class 10	Micro Class 4	Standard Class 10	Micro Class 4
4GB	—	7.95	—	—	5.99	6.45	—	4.85	7.95	12.95	5.95	—	6.99
8GB	8.99	8.95	5.95	11.95	8.79	9.95	9.95	7.69	—	14.95	—	9.95	8.99
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AT-3400	BA-00T	6.6 lb	56.7"	15"	3 lb	#OBAT3400BA00	**$149.95**
AT-3410	BA-00T	6.6 lb	59.4"	16.5"	3.4 lb	#OBAT3410BA00	**$224.95**
AT-3420	BA-0T	11 lb	62.6"	17.7"	4.2 lb	#OBAT3420BA0T	**$259.95**
6x Carbon Fiber Series with Head							
CT-3400	BB-0T	12.4 lb	56.7"	15"	3 lb	#OBCT3400BB0T	**$349.95**
CT-3410	BB-0T	16.8 lb	59.4"	16.5"	3 lb	#OBCT3410BB0T	**$399.95**
CT-3420	BB-1T	22 lb	62.8"	17.7"	4 lb	#OBCT3420BB1T	**$449.95**
CT-3500	BB-0T	12.4 lb	53.3"	12.8"	2.5 lb	#OBCT3500BB0T	**$349.95**
CT-3510	BB-0T	16.8 lb	60.6"	15.5"	3.2 lb	#OBCT3510BB0T	**$399.95**
CT-3520	BB-1T	22 lb	64.8"	16.5"	4 lb	#OBCT3520BB1T	**$469.95**

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- Uses Sony Alpha Lenses
- MS Pro Duo/HG-Duo & SD/SDHC/SDXC Card Slots
- Internal SteadyShot Image Stabilization • Full HD 1920x1080 60p Video Recording

*Body Only.....#SOSLTA99V**

24 Mega Pixels

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18-180/3.5-6.3 ED (62ø)	499.95
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16-50/2.8 ED AL IF SDM (77ø)	
17-70/4.0 AL IF SDM (67ø)	
18-55/3.5-5.6 AL II (52ø)	
50-135/2.8 ED IF SDM (67ø)	
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- Magnification 1:2
- ED glass element
- Min. focus: 9.45"
- 52mm filter diameter
- Weight: 10.6 oz

PENTAX
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- *Designed exclusively for Digital SLRs*
- SP Coating Repels Dust, Water, & Grease
- Weather resistant
- Quick-Shift Focus System
- Min. focus: 1.3'
- 62mm filter diameter
- Weight: 14.3 oz

SONY
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- Zoom Head (24-105mm)
- Bounce & Swivel Head
- Guide No. 190'
- TTL Dedication
- Vari-Power
- High-Speed Sync
- Auto WB Adjustment
- Wireless Ratio Control
- Weight: 15.6 oz

SONY
16-80mm f/3.5-4.5 Carl Zeiss T* DT Digital Lens

- *Designed exclusively for Digital SLRs*
- Ideal for snapshots, portraits, interiors, or outdoor scenery
- 35mm equiv: 24-120mm
- Min. focus: 13.8"
- 62mm filter diameter
- Weight: 15.5 oz

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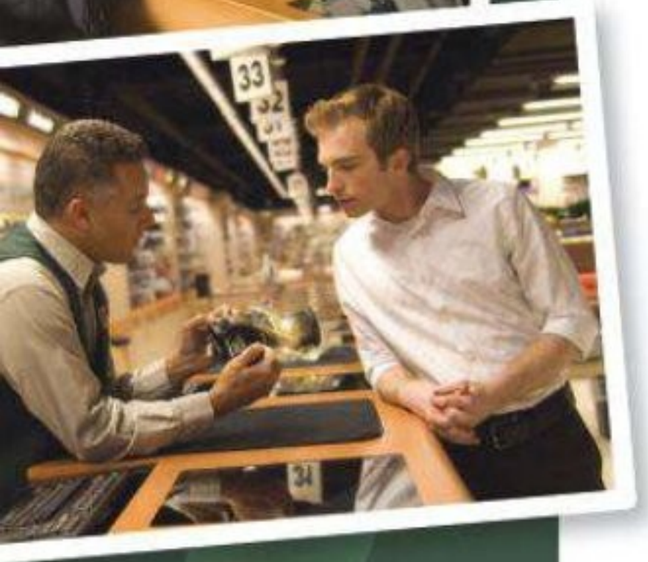

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- ISO 100-6400
- RAW + JPEG Files
- Full HD Movie Mode with Manual Exposure
- 63 Zone Dual-Layer System/9 Point AF

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Canon Digital Rebel T4i DSLR

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- DIGIC 5 Image Processor
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- SDHC/SDXC Card Slot
- ISO 100-12800, Expandable to 25600
- Full HD Movie Mode with Continuous AF
- 5.0 FPS • Multi Shot Noise Reduction

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Body Only..... #CAEDRT4I..... —
Kit with 18-55mm IS..... #CAEDRT4IK ..... ***$150 Rebate***
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18 Mega Pixels

Canon EOS-60D DSLR

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- DIGIC 4 Image Processor
- SD/SDHC/SDXC Card Slot
- Works with all Canon EF & EF-S Lenses • Vari-Angle Clear View 3.0" Flip-Out LCD
- HDMI Output to HDTV
- 5.3 fps Continuous Shooting
- ISO 6400 - Expandable to 12800

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18 Mega Pixels

Canon EOS-5D Mark III DSLR

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- Uses Canon EF Lenses
- Dual CF, SD Card Slots
- Extended ISO Range (50-102400)
- Built-In HDR & Multiple Exposure Modes
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22 Mega Pixels

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- 19-Point, All Cross-Type AF System

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Kit with 28-135mm IS..... #CAE7D28135..... ***$200 Rebate***

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- 3.2" LCD Monitor
- Uses Canon EF Lenses
- Dual CF card slots
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- Live View Still and Video Recording
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Canon SLR Lenses and Flashes

Instant Rebates! Expire 2-2-13

EOS Flash System (USA)

270EX II	***$15 Rebate****	430EX II	***$45 Rebate****
320EX		580EX II	
600EX-RT	***$60 Rebate****		
MR-14EX Ringlight	***$50 Rebate****		
MT-24EX Twin Flash	***$80 Rebate****		

EF-S Lenses for Digital Only (USA)

(Not compatible with full frame cameras)

60/2.8 USM Macro (52ø)	***$60 Rebate****		
10-22/3.5-4.5 USM (77ø)	***$120 Rebate****		
15-85/3.5-5.6 IS USM (72ø)	***$100 Rebate****		
17-55/2.8 IS USM (67ø)	***$120 Rebate****		
17-85/4-5.6 IS USM (67ø)			
18-55/3.5-5.6 IS (58ø)			
18-135/3.5-5.6 IS (67ø)			
18-200/3.5-5.6 IS (72ø)			
55-250/4.0-5.6 IS USM (58ø)			

EF Lenses (USA)

20/2.8 USM (72ø)	***$50 Rebate****		
24/2.8 IS USM (58ø)	***$150 Rebate****		
28/1.8 USM (58ø)	***$60 Rebate****		
28/2.8 IS USM (58ø)	***$100 Rebate****		
35/2 (52ø)		50/1.8 II (52ø)	***$15 Rebate****
40/2.8 STM Pancake (52ø)	***$50 Rebate****		

EF Lenses (USA)

50/2.5 Macro (52ø)	***$30 Rebate****		
50/1.4 USM (58ø)	***$60 Rebate****		
MP-E 65/2.8 1x-5x Macro (58ø)	***$100 Rebate****		
85/1.8 USM (58ø)	***$60 Rebate****		
100/2 USM (58ø)	***$50 Rebate****		
100/2.8 USM Macro (58ø)	***$50 Rebate****		
28-135/3.5-5.6 IS USM (72ø)			
70-300/4-5.6 IS USM (58ø)			
70-300/4.5-5.6 DO IS USM (58ø)			
75-300/4.0-5.6 III (58ø)			
75-300/4.0-5.6 III USM (58ø)			

TS-E MF Lenses (USA)

17/4.0 "L"	***$250 Rebate****		
24/3.5 "L" II	***$250 Rebate****		
45/2.8	***$100 Rebate****		
90/2.8	***$180 Rebate****		

EF "L" Lenses (USA)

14/2.8 USM II	***$200 Rebate****		
24/1.4 II (77ø)	***$200 Rebate****		
35/1.4 USM (72ø)	***$150 Rebate****		
50/1.2 USM (72ø)	***$180 Rebate****		
85/1.2 USM II (72ø)	***$200 Rebate****		
100/2.8 IS USM Macro (67ø)	***$150 Rebate****		

EF "L" Lenses (USA)

135/2.0 USM (72ø)	***$100 Rebate****		
180/3.5 USM Macro (72ø)	***$150 Rebate****		
200/2.8 USM II (72ø)	***$50 Rebate****		
200/2.0 IS USM (52ø)			
300/4.0 IS USM (77ø)	***$100 Rebate****		
300/2.8 IS USM II (52ø rear)			
400/5.6 USM (77ø)	***$120 Rebate****		
400/2.8 IS II (52ø rear)		600/4.0 IS II (52ø rear)	
500/4 IS USM II (52ø rear)			
8-15/4.0 Fish-eye USM	***$180 Rebate****		
16-35/2.8 USM II (82ø)	***$200 Rebate****		
17-40/4.0 USM (77ø)	***$100 Rebate****		
24-70/2.8 II USM (82ø)			
24-105/4 IS USM (77ø)			
28-300/3.5-5.6 IS USM (77ø)			
70-200/4.0 USM (67ø)	***$80 Rebate****		
70-200/4.0 IS USM (77ø)	***$200 Rebate****		
70-200/2.8 USM (77ø)	***$150 Rebate****		
70-200/2.8 IS II USM (77ø)	***$400 Rebate****		
70-300/4.0-5.6 IS USM (67ø)	***$200 Rebate****		
100-400/4.5-5.6 IS USM (77ø)	***$200 Rebate****		
1.4x III Teleconverter	***$70 Rebate****		
2x III Teleconverter	***$70 Rebate****		

NEW Canon

Instant Rebates on Lenses & Speedlites ** Expire 2-2-13*

EOS Flash System	Price	Rebate	Final
270EX II	$169.99	$15	$154.99
430EX II	$299.99	$45	$254.99
600EX-RT	$629.99	$60	$569.99
MR-14EX Ringlight	$549.99	$50	$499.99
MT-24EX Twin Flash	$829.99	$80	$749.99

TS-E "L" MF Lenses	Price	Rebate	Final
17/4.0 "L"	$2,499.00	$250	$2,249.00
24/3.5 "L" II	$2,199.00	$250	$1,949.00
45/2.8	$1,399.00	$100	$1,299.00
90/2.8	$1,399.00	$180	$1,219.00

EF-S Digital Lenses	Price	Rebate	Final
60/2.8 USM Macro	$469.99	$60	$409.99
10-22/3.5-4.5 USM	$859.99	$120	$739.99
15-85/3.5-5.6 IS USM	$799.99	$100	$699.99
17-55/2.8 IS USM	$1,179.00	$120	$1,059.00

EF Lenses	Price	Rebate	Final
20/2.8 USM	$539.99	$50	$489.99
24/2.8 IS USM	$849.99	$150	$699.99
28/1.8 USM	$509.99	$60	$449.99
28/2.8 IS USM	$799.99	$100	$699.99
40/2.8 STM Pancake	$199.99	$50	$149.99
50/1.8 II	$125.99	$15	$110.99
50/2.5 Macro	$299.99	$30	$269.99
50/1.4 USM	$399.99	$60	$339.99
MP-E 65/2.8 Macro	$1,049.00	$100	$949.00
85/1.8 USM	$419.99	$60	$359.99
100/2 USM	$499.99	$50	$449.99
100/2.8 USM Macro	$599.99	$50	$549.99

EF "L" Lenses	Price	Rebate	Final
14/2.8 USM II	$2,359.00	$200	$2,159.00
24/1.4 II	$1,749.00	$200	$1,549.00
35/1.4 USM	$1,479.00	$150	$1,329.00

EF "L" Lenses	Price	Rebate	Final
50/1.2 USM	$1,619.00	$180	$1,439.00
85/1.2 USM II	$2,199.00	$200	$1,999.00
100/2.8 IS USM Macro	$1,049.00	$150	$899.00
135/2.0 USM (72ø)	$1,089.00	$100	$989.00
180/3.5 USM Macro	$1,579.00	$150	$1,429.00
200/2.8 USM II (72ø)	$819.99	$50	$769.99
300/4.0 IS USM (77ø)	$1,449.00	$100	$1,349.00
400/5.6 USM (77ø)	$1,339.00	$120	$1219.00
8-15/4.0 Fish-eye USM	$1,499.00	$180	$1,319.00
16-35/2.8 USM II	$1,699.00	$200	$1,499.00
17-40/4.0 USM	$839.99	$100	$739.99
70-200/4.0 USM (67ø)	$709.99	$80	$629.99
70-200/4.0 IS USM	$1,349.00	$200	$1,149.00
70-200/2.8 USM (77ø)	$1,449.00	$150	$1,299.00
70-200/2.8 IS II USM	$2,499.00	$400	$2,099.00
70-300mm IS USM	$1,599.00	$200	$1,399.00
100-400mm IS USM	$1,699.00	$200	$1,499.00
1.4x III Teleconverter	$499.99	$70	$429.99
2x III Teleconverter	$499.99	$70	$429.99

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Nikon 1 J2 Mirrorless Digital Camera

- EXPEED 3 Dual Image Processor
- Full HD 1080p Movie with Stereo Sound
- Interchangeable 1 NIKKOR Lens System
- 3.0" LCD • Panoramic Mode
- SD/SDHC/SDXC Card Slot
- Selective Color & Backlighting Modes
- Night Portrait & Night Landscape Modes
- Nikon Inc. limited warranty included

Valid Through 2-2-13

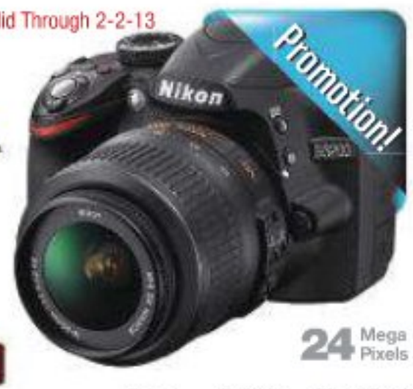
10 Mega Pixels

Available in Black, Orange, Pink, Red, Silver or White

	Price	Rebate	Final Cost
1 J2 Kit with 10-30mm VR *#NI1J21030**	546.95	—	—
1 J2 Kit with 10-30 & 30-110mm VR *#NI1J21030K**	796.95	**$100**	**696.95**
1 J1 Kit with 10-30 & 30-110mm VR *#NI1J11030**	749.95	**$250**	**499.95**

Nikon D3200 DSLR

Valid Through 2-2-13



- EXPEED III Image Processor
- HD 1080p Video
- 3" LCD • Live View
- Uses Nikon AF Lenses (1.5x factor)
- SD/SDHC/SDXC Card Slot
- 11-point AF • Up To ISO 12800
- Nikon Inc. limited warranty included

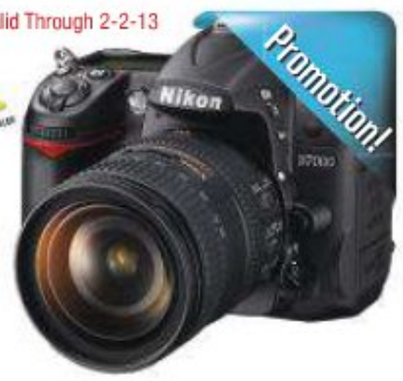
24 Mega Pixels

D3200 is available in Black or Red

	Price	Rebate	Final Cost
D3200 Kit Black w/18-55mm VR *#NID32001855**	696.95	**$100**	**596.95**
D3100 Kit with 18-55mm VR *#NID31001855*	646.95	**$170**	**476.95**
D5100 Kit with 18-55mm VR *#NID51001855*	796.95	**$200**	**596.95**

Nikon D7000 DSLR

Valid Through 2-2-13



- EXPEED 2 Image Processor
- 1080p HD Video Capture
- RAW + JPEG Still Image Capture
- Accepts Nikon AF Lenses (1.5x factor) • 3" LCD Monitor
- Twin SD/SDHC/SDXC Card Slots
- RGB 3D Matrix Metering System
- Nikon Inc. limited warranty included

16 Mega Pixels

	Price	Rebate	Final Cost
Body Only *#NID7000*	1,196.95	**$300**	**896.95**
Kit with 18-105mm VR *#NID700018105*	1,496.95	**$300**	**1,196.95**
Kit with 18-200mm VR II *#NID700018200*	2,046.95	**$550**	**1,496.95**

Nikon D600 DSLR

Valid Through 2-2-13

- FX-Format (Full-Frame) CMOS Sensor
- Uses Nikon AF Lenses
- 3.2" LCD • EXPEED 3 Processor
- SD/SDHC/SDXC Card Slot
- 1080p HD Video Capture
- 5.5 fps Continuous Shooting
- 39 Wide-Area AF Focus Points
- 100-6400 ISO, Expandable to 50-25600
- Nikon Inc. limited warranty included

24 Mega Pixels

	Price	Rebate	Final Cost
Body Only *#NID600*	2,096.95	**$100**	**1,996.95**
Kit with 24-85mm VR Lens *#NID6002485*	2,696.95	**$200**	**2,496.95**

Nikon D800 DSLR

- 35.9x24mm CMOS FX Format Sensor
- 3.2" LCD Monitor
- Nikon F Mount Lens Mount
- CF & SD Dual Card Slots
- Optical Low-Pass Filter
- Eye-Level Pentaprism Viewfinder
- 1920 x 1080/30/25/24p HD Video Capture • Matrix/Center-Weighted/Spot Metering
- Nikon Inc. limited warranty included

36 Mega Pixels

Body Only *#NID800* **2,996.95**

Nikon D4 DSLR

- RAW, TIFF, JPEG, RAW+JPEG Files
- FX-format (full-frame) CMOS Sensor
- 1080p HD Broadcast Quality Video
- EXPEED3 Image Processor
- 3.2" LCD Screen with Live View
- Compatible with Most Nikkor Optics
- Matrix, Center-Weighted, Spot Metering • 100-12800 ISO
- CF Type 1 & XQD Compatible
- Nikon Inc. limited warranty included

16 Mega Pixels

Body Only ..... *#NID4* **5,996.95**

Nikon SLR Lenses and Flashes

Instant Savings! Expire 2-2-13

	Price	Final Cost
AF Flashes		
SB-400		
SB-700	**326.95**	**296.95** [A]
SB-910	**546.95**	**496.95** [B]
R1 Wireless Twin Flash		
R1C1 Wireless Twin Flash System		
DX ED-IF Lenses for Digital Only		
10.5/2.8 Fish-Eye		
35/1.8 G AF-S (52ø)	**196.95**	—
40/2.8 G AF-S Micro (52ø)	**276.95**	—
85/3.5 G ED VR Micro (52ø)	**526.95**	**426.95** [C]
10-24/3.5-4.5 G AF-S (77ø)		
12-24/4 G AF-S (77ø)		
16-85/3.5-5.6 G AF-S VR (67ø)		
17-55/2.8 G AF-S (77ø)		
18-55/3.5-5.6 G AF-S II (52ø)		
18-55/3.5-5.6 G AF-S VR (52ø)	**196.95**	—
18-105/3.5-5.6 G AF-S VR (67ø)	**396.95**	—
18-200/3.5-5.6 G AF-S VR II (72ø)	**846.95**	**596.95** [D]
18-300/3.5-5.6 G AF-S ED VR (77ø)	**996.95**	—
55-200/4-5.6 G AF-S (52ø)		
55-200/4-5.6 G AF-S VR (52ø)	**246.95**	**146.95** [E]
55-300/4.5-5.6 G AF-S VR (58ø)	**396.95**	**246.95** [F]

	Price	Final Cost
D-Type AF Lenses		
14/2.8 D ED		
16/2.8 D (39ø) with Hood		
20/2.8 D (62ø)		
24/2.8 D (52ø)		
24/1.4 G AF-S ED (77ø)		
24/3.5 D ED PC-E (77ø)		
28/1.8 G AF-S (67ø)	**696.95**	—
28/2.8 D (52ø)		
35/2.0 D (52ø)		
35/1.4 G AF-S ED (67ø)		
45/2.8 D ED PC-E Micro (77ø)		
50/1.8 D (52ø)		
50/1.8 G AF-S (58ø)	**216.95**	—
50/1.4 D (52ø)		
50/1.4 G AF-S (58ø)		
60/2.8 D Micro (62ø) (1:1)		
60/2.8 G AF-S ED Micro (62ø)		
85/1.8 D (62ø) with Hood		
85/1.4 D IF (77ø)		
85/1.4 G AF-S (77ø)		
85/1.8 G AF-S (67ø)	**496.95**	—
85/2.8 PC-E Micro (77ø)		
105/2.8 G AF-S ED-IF VR Micro (62ø)		
105/2.0 DC D with Hood (72ø)		
180/2.8 D ED-IF (72ø)		

	Price	Final Cost
D-Type AF Lenses		
200/4 D ED-IF Micro with Case (62ø)		
200/2 G AF-S ED-IF VR II (52ø)		
300/4.0 D AF-S ED-IF (77ø)		
300/2.8 G AF-S VR (52ø-R)		
400/2.8 G AF-S VR ED (52ø)		
500/4.0 G AF-S VR ED (52ø)		
600/4.0 G AF-S VR ED (52ø)		
14-24/2.8 G AF-S ED-IF	**1,996.95**	—
16-35/4.0 G AF-S ED VR (77ø)		
17-35/2.8 D AF-S ED-IF (77ø)		
24-70/2.8 G AF-S ED-IF (77ø)	**1,886.95**	**1686.95** [G]
24-85/2.8-4.0 D IF (72ø)		
24-85/3.5-4.5 G AF-S ED VR (72ø)	**596.95**	**496.95** [H]
24-120/4.0 G AF-S ED VR (77ø)	**1,296.95**	—
28-300/3.5-5.6 G AF-S ED VR (77ø)	**1,046.95**	**896.95** [I]
70-200/2.8 G AF-S ED-IF VR II (77ø)	**2,396.95**	**2196.95** [J]
70-300/4.0-5.6 G (62ø)		
70-300/4.5-5.6 G-AFS VR (67ø)	**586.95**	**386.95** [K]
80-200/2.8 D with Collar (77ø)		
80-400/4.5-5.6 D VR (77ø)		
200-400/4 G AF-S ED VR II (52ø)		
TC-14E II (1.4x) Teleconverter		
TC-17E II (1.7x) Teleconverter		
TC-20E III (2x) Teleconverter		

NEW Nikon

Instant Savings up to $600 on Select DSLRs Flash & Lens Combos

Expire 2-2-13

Receive Instant Flash/Lens Savings

		Lens	Price	Savings	Final
Buy Flash [A or B] **with** any current Nikon **DSLR**	[A]	SB-700	$326.95	$30	$296.95
	[B]	SB-910	$546.95	$50	$496.95
Buy Lens [C or D] **with** D3100, D3200, D5100, D90, D7000 or D300s **DSLR**	[C]	85mm f/3.5 G ED VR Micro DX	$526.95	$100	$426.95
	[D]	18-200mm f/3.5-5.6 G DX	$846.95	$250	$596.95
Buy Lens [E or F] **with** D3000, D3100, D3200, D5100, D7000, D90 **DSLR**	[E]	55-200mm f/4.0-5.6 G DX	$246.95	$100	$146.95
	[F]	55-300mm f/4.5-5.6 G DX	$396.95	$150	$246.95
Buy Lens [G, H, I, J or K] **with** D7000, D300s, D600, D800, D800E, D3x or D4 **DSLR**	[G]	24-70mm f/2.8 G	$1,886.95	$200	$1,686.95
	[H]	24-85mm f/3.5-4.5 G AF-S ED VR	$596.95	$100	$496.95
	[I]	28-300mm f/3.5-5.6 G AF-S VR	$1,046.95	$150	$896.95
	[J]	70-200mm f/2.8 G AF-S ED-IF VR II	$2,396.95	$200	$2,196.95
	[K]	70-300mm f/4.5-5.6 G-AFS VR	$586.95	$200	$386.95

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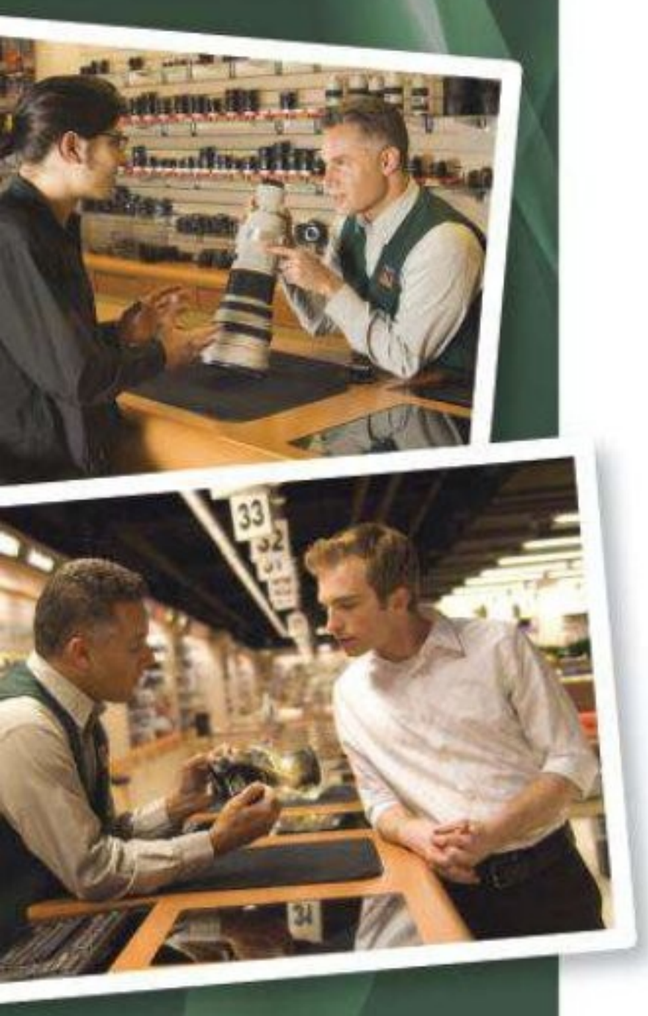

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TAMRON AF LENSES

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Di for both digital and film SLR cameras • **Di-II** for Digital SLRs Only • **Di III** for mirror-less cameras Only

C = Canon N = Nikon P = Pentax SM = Sony/Minolta SE = Sony E Mount *** Price After Rebate* *Expires 1-31-13*

		SKU #	Available for	Rebate	Price
Di-II	60/2.0 LD IF Macro (55ø)	#TA602DI*	C, N, SM	$100	424.00**
Di	90/2.8 Macro (55ø)	#TA9028M*	C, N, P, SM	$50	449.00**
Di	90/2.8 SP Macro USD (58ø)	#TA9028VC*	C, N, SM	—	749.00
Di	180/3.5 LD IF Macro (72ø)	#TA18035*	C, N, SM	$50	689.00**
Di-II	10-24/3.5-4.5 (77ø)	#TA102435*	C, N, P, SM	$50	449.00**
Di-II	17-50/2.8 XR LD IF Aspherical (67ø)	#TA175028*	C, N, P, SM	$75	424.00**
Di-II	17-50/2.8 XR VC LD IF Asph. (67ø)	#TA175028*Q	C, N	$100	549.00**
Di-II	18-200/3.5-6.3 (62ø)	#TA1820035*	C, N, P, SM	$50	249.00**
Di-III	18-200/3.5-6.3 VC (62ø) Black or Silver	#TA1820035S*	SE	—	739.00
Di-II	18-270/3.5-6.3 VC PZD (62ø)	#TA18270*	C, N, SM	$100	549.00**
Di	24-70/2.8 VC USD (82ø)	#TA247028*	C, N, SM	—	1,299.00
Di	28-75/2.8 XR (67ø)	#TA287528*	C, N, P, SM	$25	474.00**
Di	28-300/3.5-6.3 XR LD (62ø)	#TA2830035XD*	C, P, SM	—	419.00
Di	28-300/3.5-6.3 XR VC (62ø)	#TA2830035*	C, N	—	629.00
Di	70-200/2.8 LD IF Macro (77ø)	#TA7020028M*	C, N, P, SM	—	769.00
Di	70-300/4.0-5.6 VC USD (62ø)	#TA70300*	C, N, SM	$100	349.00**
Di	75-300/4.0-5.6 LD (62ø)	#TA753004*	C, N, SM	—	164.00
Di	200-500/5-6.3 LD IF (86Cø)	#TA2005005*	C, N, SM	—	949.00
	1.4x SP AF Pro Teleconverter	#TA14XP*	C, N	—	224.00
	2x SP AF Pro Teleconverter	#TA2XP*	C, N	—	254.00

Tokina AF LENSES

DX – for Digital SLRs Only **FX** – Designed for full frame DSLRs *** Price After Rebate* *Exp. 1-31-13*

		Canon EOS	Nikon AF	Rebate	Price
FX	100/2.8 Pro D Macro (52ø)	#TO10028PCAF	#TO10028PNAF	—	489.00
DX	10-17/3.5-4.5 ATX Fisheye	#TO101735CAF	#TO101735NAF	—	669.00
DX	11-16/2.8 Pro II (77ø)	#TO111628PCII	#TO111628PNII	$40	699.00**
DX	12-24/4.0 Pro II (77ø)	#TO12244DXC	#TO12244DXN	—	499.00
FX	16-28/2.8 Pro	#TO1628FXC	#TO1628FXN	$100	749.00**
FX	17-35/4 Pro (82ø)	#TO1735F4FXC	#TO1735F4FXN	$70	599.00**

SIGMA AF LENSES & FLASHES

New! Instant Rebates up to $200 *Expires 2-28-13* *** Price After Rebate*

DC – for Digital SLRs Only • **DG** – Optimized for Digital SLRs

H – HSM Model with Canon, Nikon, Sigma
R – Rear Slip-in Gelatin Filter Slot

		Canon	Nikon	Pentax	Sigma	Sony	Rebate	Price
DC	4.5mm f/2.8 EX Circular Fisheye HSM R	#SI4528EXDCC	#SI4528EXDCN	#SI4528EXDCP	#SI4528EXDCSI	#SI4528EXDSO	$100	799.00**
DG	8mm f/3.5 EX Circular Fisheye R	#SI835CA	#SI835NA	—	#SI835SI	#SI835SO	—	899.00
DC	10mm f/2.8 EX Fisheye HSM R	#SI1028EXDCC	#SI1028EXDCN	#SI1028EXDCP	#SI1028EXDCSI	#SI1028EXDCSO	—	649.00
DG	15mm f/2.8 EX Diagonal Fisheye R	#SI1528DGCAF	#SI1528DGNAF	#SI1528DGPAF	#SI1528DGSA	#SI1528DGMAF	—	609.00
DG	20mm f/1.8 EX DF RF Aspherical (82ø)	#SI2018CAF	#SI2018NAF	#SI2018PAF	#SI2018SA	#SI2018MAF	—	629.00
DG	24mm f/1.8 EX DF Aspherical Macro (77ø)	#SI2418MCAF	#SI2418MNAF	#SI2418MPAF	#SI2418MSA	#SI2418MMAF	—	549.00
DG	28mm f/1.8 EX DF Aspherical Macro (77ø)	#SI2818MCAF	#SI2818MNAF	#SI2818MPAF	#SI2818MSA	#SI2818MMAF	—	449.00
DC	30mm f/1.4 EX HSM (62ø)	#SI3014DCCAF	#SI3014DCNAF	#SI3014DCPAF	#SI3014DCSA	#SI3014DCMAF	$50	439.00**
DG	35mm f/1.4 HSM (67ø)	#SI3514C	#SI3514N	#SI3514P	#SI3514SI	#SI3514S	—	899.00
DG	50mm f/1.4 EX (77ø) H	#SI5014C	#SI5014N	#SI5014PE	#SI5014SI	#SI5014SOM	$50	449.00**
DG	50mm f/2.8 EX Macro (55ø)	#SI5028MDGCAF	#SI5028MDGNAF	#SI5028MDGPAF	#SI5028MDGSA	#SI5028MDGMAF	—	369.00
DG	70mm f/2.8 EX Macro (62ø)	#SI7028MDGCA	#SI7028MDGNA	#SI7028MDGPA	#SI7028MDGSA	#SI7028MDGSAQ	—	499.00
DG	85mm f/1.4 EX HSM (77ø)	#SI8514C	#SI8514N	#SI8514P	#SI8514SI	#SI8514S	$75	894.00**
DG	105mm f/2.8 EX Macro OS HSM (62ø)	#SI10528MDGCE	#SI10528MDGNQ	—	#SI10528MDGS	#SI10528MDGSM	$200	769.00**
DG	150mm f/2.8 EX APO Macro OS HSM (72ø)	#SI15028AMOC	#SI15028AMON	#SI15028AMOP	#SI15028AMSI	#SI15028AMOS	—	1,099.00
DG	180mm f/2.8 EX APO Macro OS HSM (86ø)	#SI18028AMEOC	#SI18028AMEON	—	#SI18028AMEOQ	#SI18028AMEOS	—	1,699.00
DG	300mm f/2.8 APO EX HSM	#SI30028DGCAF	#SI30028DGNAF	#SI30028DGPAF	#SI30028DGSA	#SI30028DGMAF	—	3,399.00
DG	500mm f/4.5 APO EX HSM	#SI50045DGCAF	#SI50045DGNAF	#SI50045DGPAF	#SI50045DGSA	—	—	4,999.00
DC	8-16mm f/4.5-5.6 HSM	#SI8164556CA	#SI8164556NI	#SI8164556PE	#SI8164556SI	#SI8164556SO	$50	649.00**
DC	10-20mm f/4-5.6 EX HSM (77ø)	#SI102045DCAF	#SI102045DNAF	#SI102045DPAF	#SI102045DSA	#SI102045DMAF	—	479.00
DC	10-20mm f/3.5 EX HSM (82ø)	#SI102035C	#SI102035SN	#SI102035P	#SI102035SG	#SI102035S	$50	599.00**
DG	12-24mm f/4.5-5.6 EX Aspherical HSM II	#SI122445C	#SI122445N	#SI122445P	#SI122445SI	#SI122445S	—	949.00
DC	17-70mm f/2.8-4.0 OS Macro HSM (72ø)	#SI177028DCC	#SI177028DCNQ	—	#SI177028DCSI	#SI177028DCSM	—	449.00
DC	18-50mm f/2.8-4.5 OS HSM (67ø)	#SI185028DOC	#SI185028DON	#SI185028DOP	—	—	—	199.00
DC	18-200mm f/3.5-6.3 OS II HSM (72ø)	#SI1820035CQ	#SI1820035NQ	#SI1820035P	#SI1820035SAQ	#SI1820035SQ	$50	449.00**
DC	18-250mm f/3.5-6.3 OS HSM (72ø)	—	#SI1825035N	#SI1825035CP	—	—	—	399.00
DC	18-250mm f/3.5-6.3 OS Macro HSM (62ø)	#SI1825035MC	#SI1825035MN	#SI1825035MP	#SI1825035MS	#SI1825035MO	—	549.00
DG	24-70mm f/2.8 EX IF HSM (82ø)	#SI247028C	#SI247028NF	#SI247028PS	#SI247028S	#SI247028SM	$75	824.00**
DC	50-150mm f/2.8 EX APO OS HSM (77ø)	#SI5015028CA	#SI5015028NA	—	#SI5015028SAF	—	$100	999.00**
DG	50-500mm f/4.5-6.3 APO OS HSM (95ø)	#SI505004563C	#SI505004563N	#SI505004563P	#SI505004563SA	#SI505004563SM	$150	1,509.00**
DG	70-200mm f/2.8 EX APO OS HSM (77ø)	#SI7020028CQ	#SI7020028NI	#SI7020028P	SI7020028SIQ	#SI7020028SOQ	$150	1,249.00**
DG	70-300mm f/4-5.6 Macro (58ø)	#SI703004SCAF	#SI70300456N	#SI703004PAF	#SI703004SA	#SI703004MAF	$25	144.00**
DG	70-300mm f/4-5.6 APO Macro (58ø)	#SI703004DGCA	#SI70300456AN	#SI703004DGPA	#SI703004DGSA	#SI703004DGMA	—	199.00
DG	70-300mm f/4-5.6 OS (62ø)	#SI7030045C	#SI7030045N	#SI7030045P	#SI7030045S	#SI7030045SM	$50	309.00**
DG	120-300mm f/2.8 EX APO OS HSM (105ø)	#SI12030028C	#SI12030028N	#SI12030028P	#SI12030028SI	—	$200	2,999.00**
DG	120-400mm f/4.5-5.6 APO OS HSM (77ø Rear)	#SI120400C	#SI120400N	#SI120400P	#SI120400S	#SI120400SQ	$50	949.00**
DG	150-500mm f/5-6.3 APO OS HSM	#SI150500C	#SI150500N	#SI150500P	#SI150500S	#SI150500M	$50	1,019.00**
DG	1.4x EX APO Tele-Converter	#SI1.4XDGCAF	#SI1.4XDGNAF	#SI1.4XDGPAF	#SI1.4XDGSA	#SI1.4XDGMAF	$25	224.00**
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DG	EF-610 ST	#SIEF610STC	#SIEF610STN	#SIEF610STP	#SIEF610STSI	#SIEF610STS	$30	135.00**
DG	EF-610 Super Flash	#SIEF610C	#SIEF610N	#SIEF610P	#SIEF610SI	#SIEF610S	$30	225.00**
DG	EM-140 TTL Ringlight	#SIEM140DGC	#SIEM140DGN	#SIEM140DGP	#SIEM140DGS	#SIEM140DGM	$30	349.00**

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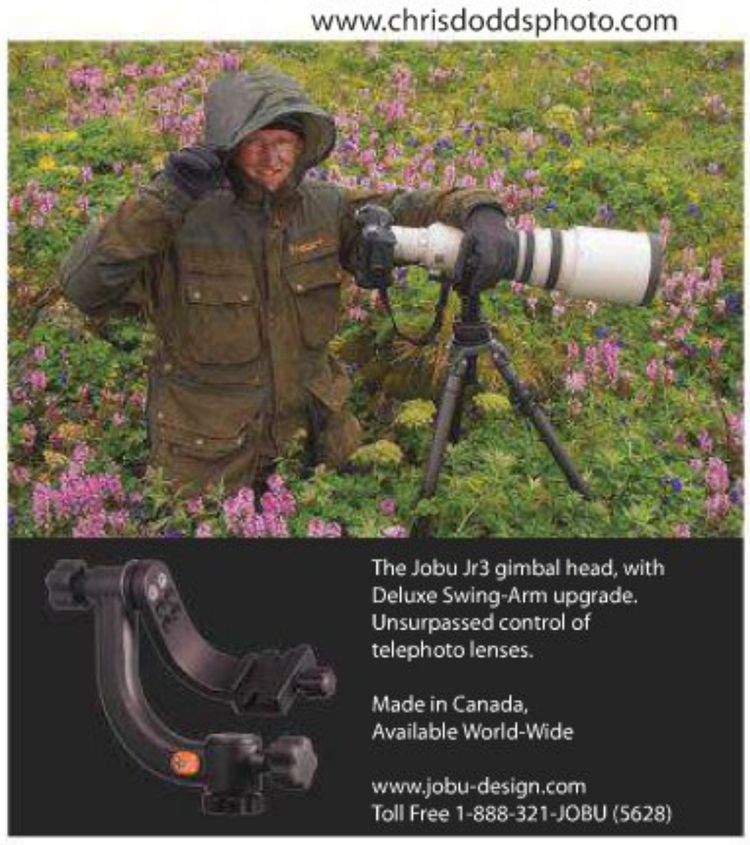

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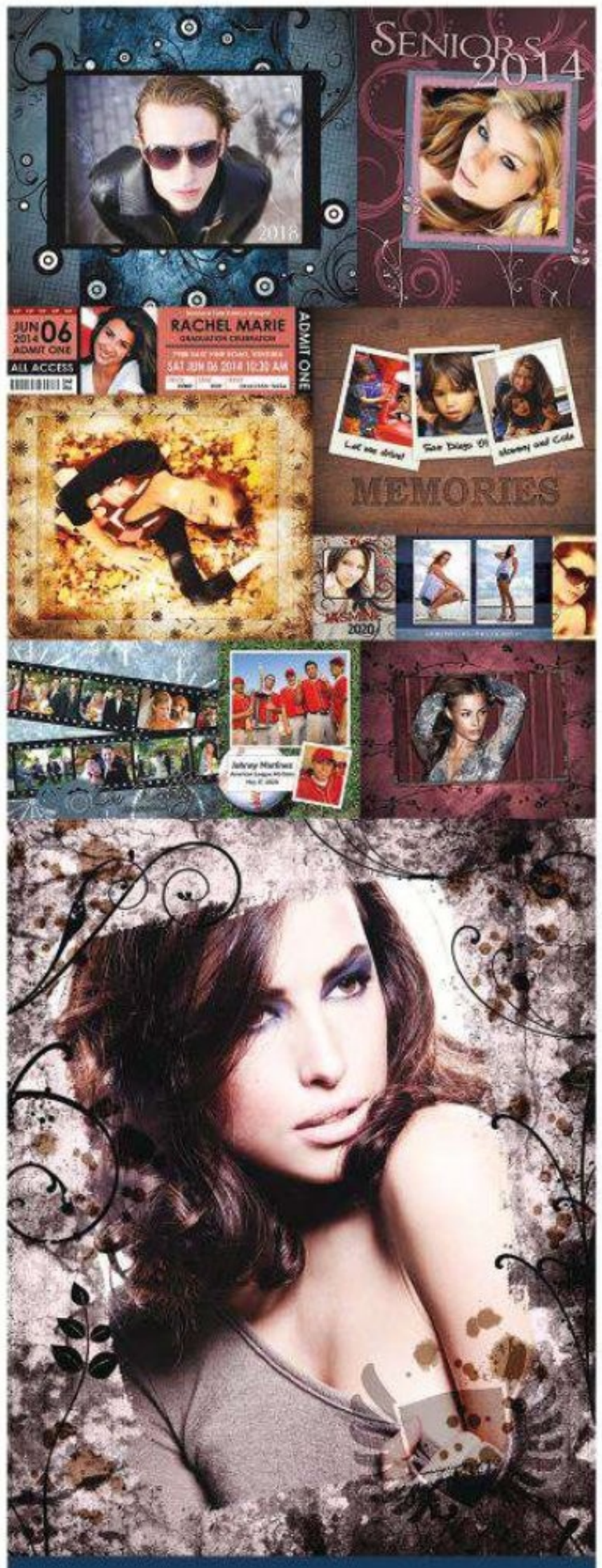

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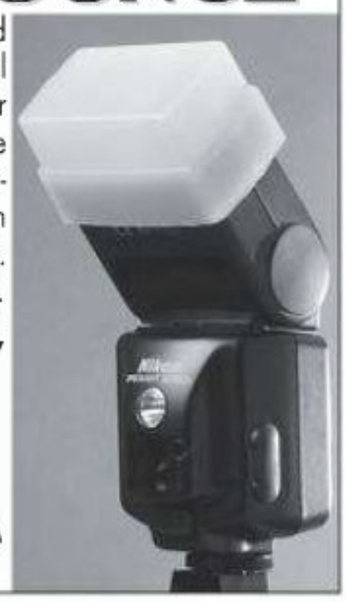

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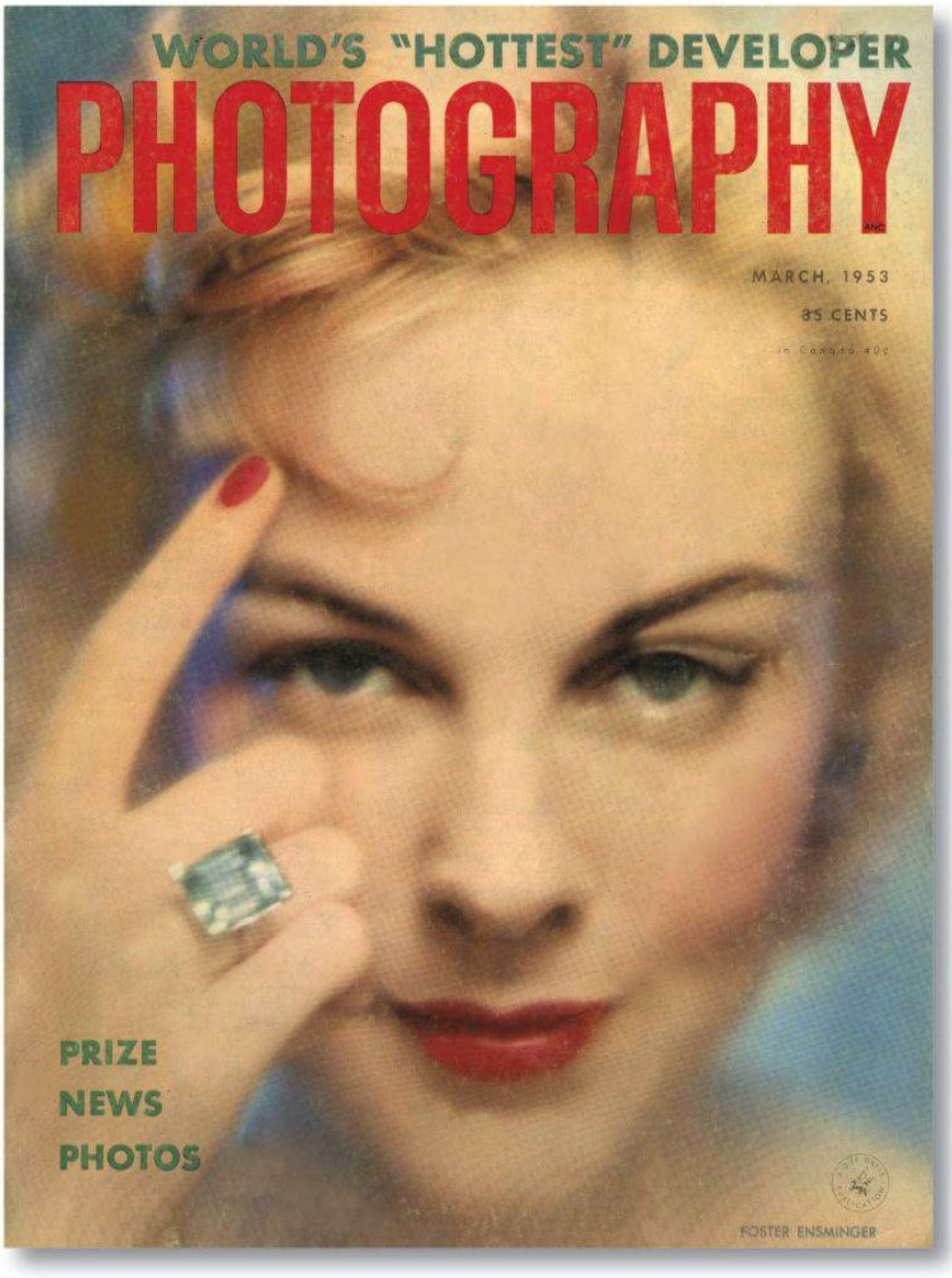

▲ Stylized Portrait

This high-key, soft-focus photo of Madelon Mason was an experimental shot by New York professional Foster Ensminger, who made the exposure through a frame filled with spun glass that had been cut out to reveal only the face. He placed a No. 1 Kodak diffuser over the 16.5-inch Cooke f/6.3 lens, used wide open. Two 1000-watt floods covered by sheets of tissue paper provided the main light, while a "dinky" (small spot) covered with blue cellophane added blue highlights. The hair was illuminated by a 750-watt spot.

60 YEARS AGO

We published photos by 18-year-old Ken Wittenberg, on display at New York's Museum of Modern Art.

▼ Who Needs a Contax?

Right after a full-page ad for Zeiss cameras that included the $300 Contax 35mm came this ad for a $40 Iloca Quick "A" 35mm camera. As the ad pointed out, the Iloca was "made by men who devote every waking hour to thinking about how they can make good cameras better." This camera came from East Germany and carried a price you couldn't refuse.

▶ Bah, Humbug

This picture of an unsmiling Dwight Eisenhower won first prize in the portrait category at the 1952 New York Press Photographers show. The picture was made by Bert Brandt of United Press Newspictures using the 4x5 workhorse Speed Graphic with a No. 5 flashbulb on the camera. Expoure on fast pan film was 1/400 sec at f/16.

▼ Stars Behind the Lens

Among the highest-paid photographers in the world were the relative handful of movie cameramen with the letters "ASC" after their names. They were so important that they no longer touched the motion-picture cameras themselves, but instead directed all phases of cinematography. This feature story by Joseph V. Mascelli looked at the history of this all-star world, starting with Billy Bitzer, who photographed *Birth of a Nation* for D.W. Griffith. —*Harold Martin*

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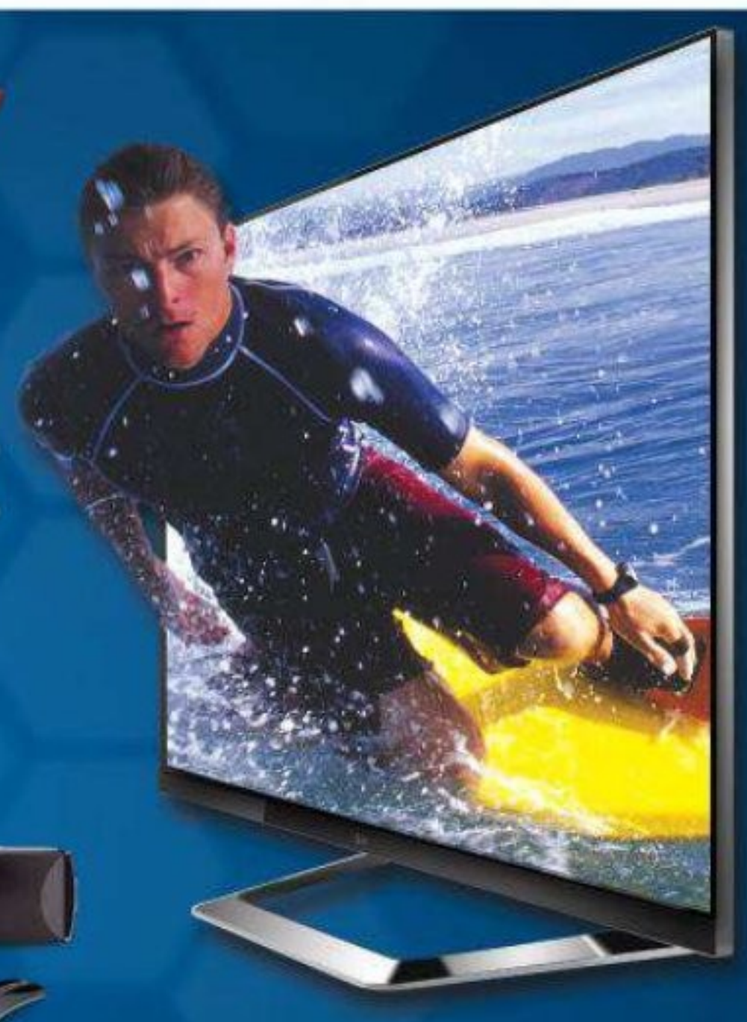

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CANON EOS 6D

CONTINUED FROM PAGE 65

($1,600 street, body only) might find the 6D a tad on the sluggish side, and not as powerful as that body when it comes to focusing. Furthermore, the 7D's and 5D Mark III's systems cover a larger part of the finder than the 6D's 11-point diamond pattern does.

While the 6D can't be called slow when it comes to AF, it becomes less consistent as the light grows dimmer. Our official test results represent the average focusing speed at various light levels when using our 50mm f/1.4 test lens. But, at EV 1 and darker, we saw more variation (in excess of a tenth of a second on either side of the average) than we're used to. To its credit, the 6D never failed to focus in our test.

Its AF is also rated by Canon to extend down to EV –3, while the Nikon D600's is rated as effective down to only EV –1, which we confirmed in our test. Our test only extends to EV –2 (the lower limit of our Sekonic L-758DR light meter), so we couldn't confirm Canon's claimed bottom limit.

In the Field

While Nikon's D600 feels as though it belongs below the D800 in that company's line of DSLRs, the 6D feels every bit as solid as the 5D Mark III. Sure, it's missing some amenities, notably the 5D Mark III's joystick and 100-percent accurate viewfinder, but it still has the feel of a powerful camera.

The 6D sports only a single SD-card slot (the Nikon D600 has two), and it lacks a pop-up flash (you can use the one on the D600 to wirelessly control off-camera flashes). We continue to be puzzled as to why Canon hasn't begun to include this in more of its DSLRs, especially in one like the 6D that is meant to attract photographers who aren't pros.

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Anyone used to mid-level and above Canon bodies will find themselves at home with the 6D. Dedicated buttons for AF, drive, ISO, and metering line the top of the LCD on the camera's top panel. The large wheel on the back provides constant access to exposure compensation, while an inset control pad lets you navigate through menus or select focusing points. This is not as elegant as a joystick, but it works just fine.

Canon's 63-zone exposure metering system works quite well. It did a good job of conserving highlight info, but it doesn't seem to make decisions that are as complex as Nikon's Matrix metering does. Furthermore, the D600's spot meter is much tighter, covering 1.5 percent of the finder versus the 6D's 3.5-percent spot.

Burst shooters won't be blown away by the 6D's 4.5-frame-per-second continuous drive mode, but we should remember that only a few years ago this would be considered fast for a camera in this price range. The buffer can hold up to 1,250 large, fine JPEGs, 17 RAW images, or 8 RAW + large, fine JPEGs. The D600 captures one more frame per second than the 6D, but maxes out at 57 JPEGs while allowing up to 16 RAW images.

The coolest new thing about the 6D is its built-in Wi-Fi. At a family gathering, we shot a group portrait, downloaded the free (Android/iOS) Canon EOS Remote app to a Samsung Galaxy SIII smartphone, figured out how to pair the camera and phone without reading any instructions, and managed to have the shot uploaded to Facebook all within 10 minutes.

Pairing the devices took the longest chunk of that time—though it shouldn't have. Just make sure to activate Wi-Fi on your phone, select the camera through the phone, and all should be well. We mistakenly tried pressing the camera connection button in the app without first telling the phone to accept the Wi-Fi connection to the 6D. Subsequent uploads went quickly and painlessly.

In addition to transfering images, the app can be used as a remote viewfinder. Place the 6D anywhere within Wi-Fi range and you can see the camera's live view through your phone, change basic settings (such as shutter speed, aperture, and ISO), and trigger the shutter.

Bottom Line

Just as with the D600, we were quite impressed with the EOS 6D. There are clear compromises that must be made to reach this price point, but we feel Canon did a good job of cutting costs in the right places to create a camera that is a pleasure to use.

Shooters who demand pro-level power will still gravitate toward pricier models or stick with APS-C. But, for the majority of shooters, the 6D offers plenty of bang for the buck. At the same time, we hope Canon includes a pop-up flash on the next iteration of this camera. The benefit in wireless control alone is enough to warrant it. Plus, even though we always say not to use it unless you absolutely have to, we do sometimes use pop-up flash and it's good to have in a jam.

While we're sure that there will always be people who want full-frame image quality for even less money, Canon has done a great job of delivering wonderful image quality for a price that should satisfy more photographers than ever before.

—Philip Ryan

For info on how we test DSLRs, go to PopPhoto.com/reviews.

SPECIFICATIONS

IMAGING: 20.2MP effective, full-frame CMOS sensor captures images at 5472x3648 pixels with 14 bits/color in RAW mode.

STORAGE: SD, SDHC, SDXC. Stores JPEG, CR2 RAW, or RAW + JPEG files.

VIDEO: Records up to 1920x1080 pixels at 30 or 24 fps in MPEG-4 H.264 format with choice of ALL-I or IPB compression; built-in monaural microphone; stereo microphone input; approx. 29-min 29sec maximum clip size at highest quality.

BURST RATE: Full-sized JPEGs (Fine), up to 1,250 shots at 4.5 fps; RAW, up to 17 shots at 4.5 fps; RAW + JPEG, up to 8 shots at 4.5 fps; using a UHS-I compatible SD card.

AF SYSTEM: TTL phase-detection with 11 illuminated focus points (single center cross-type point); single-shot, continuous, predictive focus tracking; tested sensitivity down to EV –2 (at ISO 100, f/1.4), Canon rates to EV –3.

LIVE VIEW: Full-time contrast detection, or single-shot phase-detection AF with mirror interrupting view momentarily.

SHUTTER SPEEDS: 1/4000 to 30 sec, plus B (1/3-EV increments); shutter life not rated; flash sync to 1/180 second.

METERING: TTL metering using 63-zone sensor; Evaluative, centerweighted, partial (approx. 8% of finder at center), and spot (approx. 3.5% of finder at center); range, 1 to 20 EV (at ISO 100).

ISO RANGE: ISO 100–25,600 (in 1- or 1/3-EV steps), expandable to ISO 50–102,400.

VIEWFINDER: Fixed eye-level pentaprism.

LCD: Fixed 3-in. TFT with 1.04 million-dot resolution, 7-step brightness adjustment.

OUTPUT: Hi-Speed USB 2.0, mini-HDMI video, and composite video.

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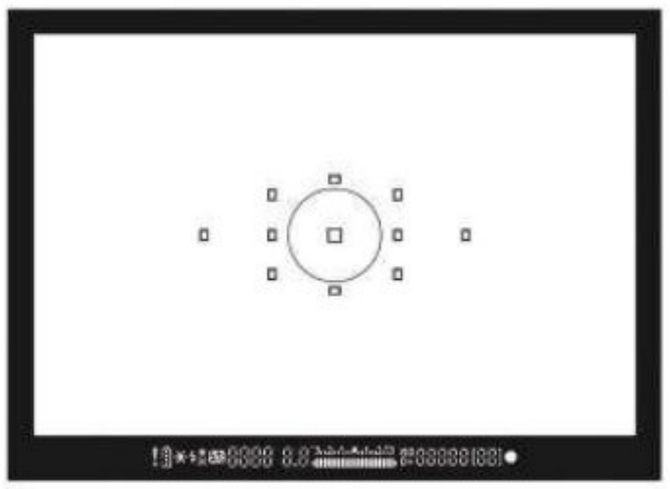

VIEWFINDER TEST: Accuracy, 97% (Excellent); Magnification, 0.71X (Very Good).

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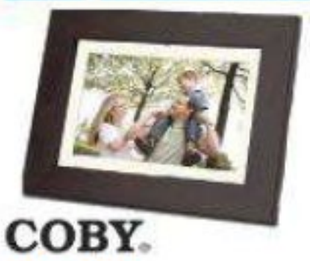

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TAMRON 70–200MM F/2.8 DI VC USD

CONTINUED FROM PAGE 69

In the field, we were bowled over by the near-silent USD focusing motor. On our Canon EOS 5D Mark III, AF was rapid, silent, and sure.

On our optical test bench, the lens produced Excellent-range SQF numbers for sharpness and contrast at 70mm and 135mm. Like most zooms in this category, though, it dipped to Very Good at 200mm. (Only the Nikon held onto top sharpness at 200mm.)

In our DxO Analyzer 4.1 tests, distortion control proved best in its class: it produced only Slight distortion at 70mm and 200mm (0.11% barrel and 0.18% pincushion, respectively) and Imperceptible (0.09%) pincushioning at 135mm.

The new image stabilizer seems truly improved. In our tests, three users averaged about 3.5 stops of additional handheld sharpness.

Tempted by the nonstabilized version? It is a half-pound lighter, costs half as much, offers much more subject magnification, and takes sharper images at 200mm. But you'd miss out on a whole lot of handheld shooting. For us, money aside, it's a no-brainer. —*Julia Silber*

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2.8	96.3	95.2	92.5	87.2	80.7
4.0	96.3	95.2	92.5	87.2	80.8
5.6	96.2	95.1	92.3	86.9	80.2
8.0	96.6	95.5	93.0	88.2	82.3
11.0	96.3	95.2	92.6	87.3	81.0
16.0	96.0	94.7	91.8	86.0	78.9
22.0	95.5	94.1	90.8	84.1	75.8
32.0	94.7	93.1	89.1	80.5	69.6

135 MM

Size	5x7	8x10	11x14	16x20	20x24
2.8	96.8	95.8	93.5	88.7	82.7
4.0	97.2	96.4	94.4	90.5	85.8
5.6	97.4	96.6	94.8	91.4	87.3
8.0	97.5	96.7	94.9	91.5	87.5
11.0	97.2	96.3	94.3	90.6	86.0
16.0	96.8	95.8	93.1	88.4	82.6
22.0	95.8	94.8	91.5	85.2	77.3
32.0	95.0	93.5	89.7	81.2	70.3

200 MM

Size	5x7	8x10	11x14	16x20	20x24
2.8	92.0	87.6	74.4	55.5	43.6
4.0	95.0	92.4	84.6	73.6	66.3
5.6	95.4	93.0	86.1	75.8	68.4
8.0	95.4	93.2	86.7	76.0	67.0
11.0	96.0	94.2	88.9	80.0	72.1
16.0	95.9	94.1	88.6	79.5	71.2
22.0	95.3	93.1	86.5	75.5	65.7
32.0	93.8	90.7	81.4	66.3	53.6

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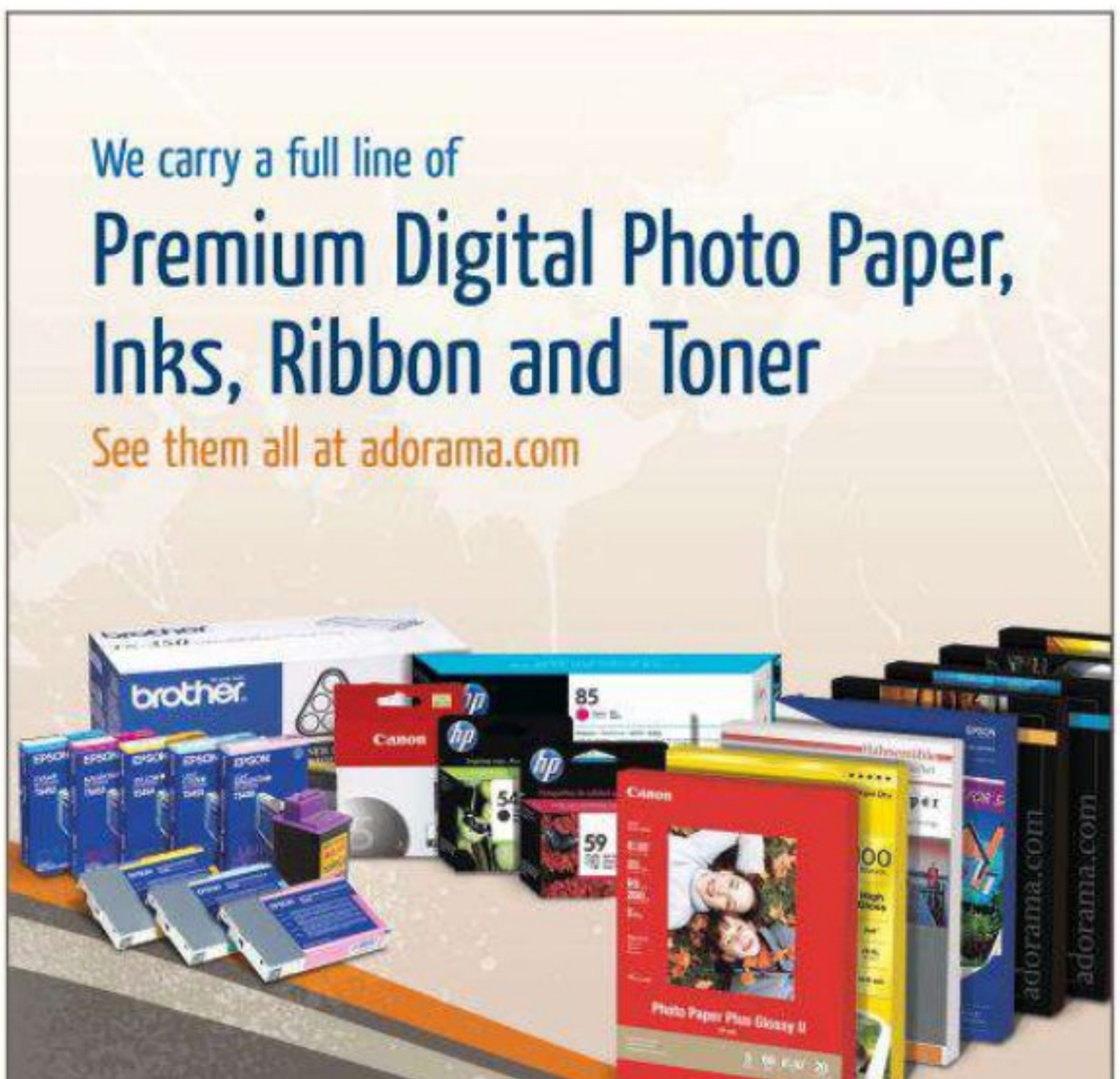

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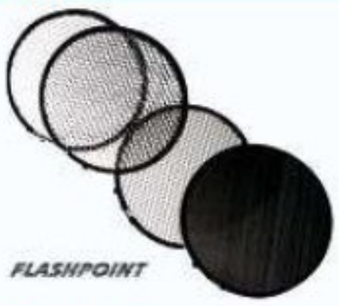

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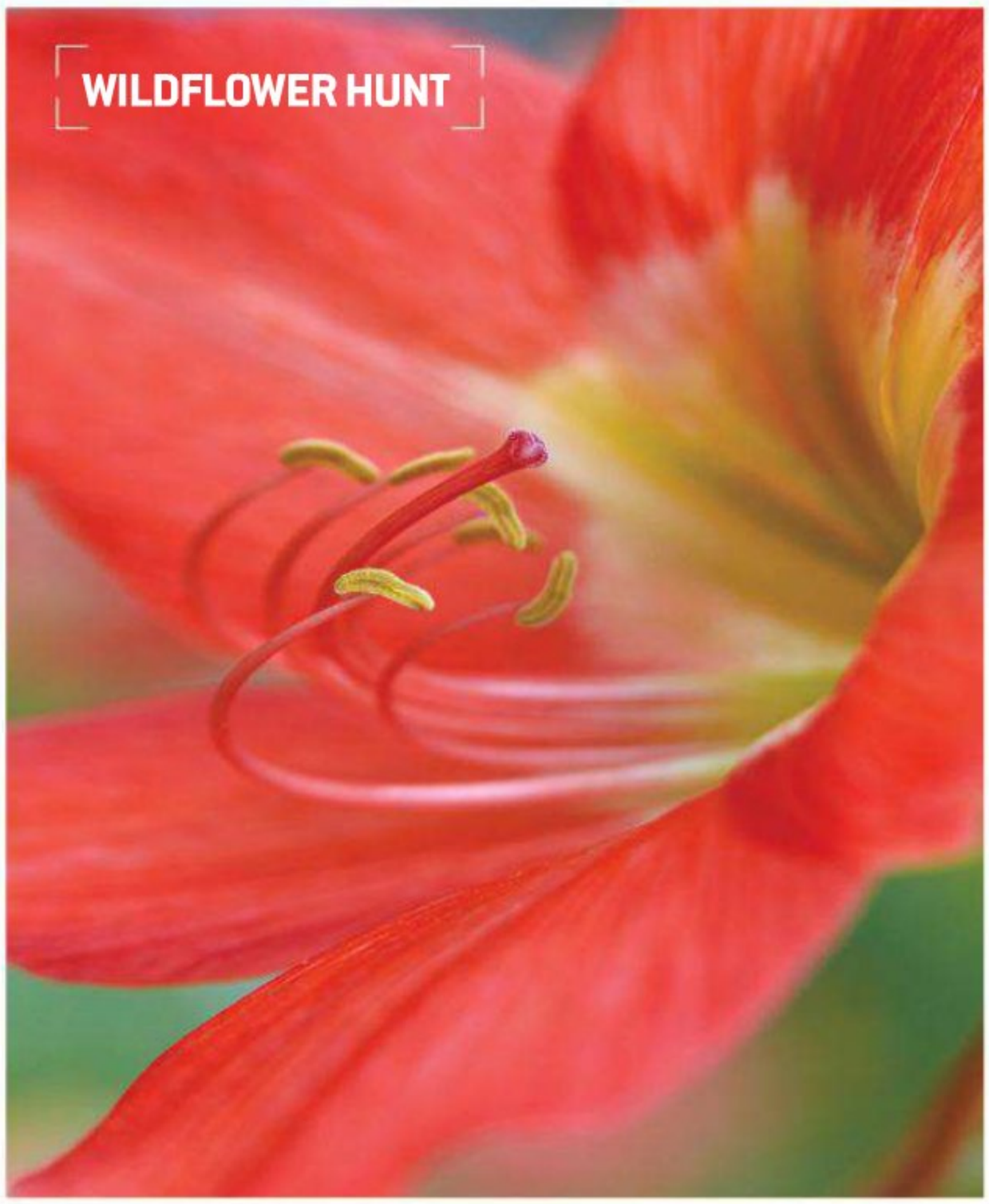

AMARYLLIS, PANGLAO ISLAND, PHILIPPINES
Tim Fitzharris used selective focus with shallow depth of field to emphasize the stamen and pistils. He used a Canon 5D Mark II with a 70–200mm f/4L EF IS lens for the exposure of 1/125 second at f/5.6, ISO 800.

CONTINUED FROM PAGE 47

zero for the flower, both visually and biologically. Even the petals showcase them with framing and leading lines.

Lastly, lower the camera to near bloom level and adjust the aperture so that the background is comprised of a distant, out-of-focus zone. The blurred background will emphasize the main subjects and add depth to the portrait.

Use Plamps and Plates

These simple, inexpensive accessories are my favorites, especially for close-ups. Plant clamps, or "Plamps" (www.tripodhead.com) are flexible plastic arms used to hold a flower still or to reposition blooms for better composition. Clamp one end to a screwdriver that is stuck in the ground and the other end to a part of the flower that is out of the frame. Hold the jaws of the clamp to move the flower into a photogenic pose. Once your subject is arranged, use a white paper plate to bounce light into the shadow side of the composition. This improves detail and color saturation. On overcast days hold the plate close—just outside the frame—to achieve the desired effect.

Seek Complements

For the most dynamic color studies I try to include flower types of two or more complementary hues; the contrast makes the colors appear even more vivid. Fortunately, this doesn't involve a lot of searching, because Mother Nature grows them that way! She, too, understands the color wheel, and you will often find red Indian paintbrushes growing alongside blue lupines, or orange poppies palling around with purple owl's clover—anything to attract an insect or hummingbird. With stands of a single warm hue, it's easy enough to get low and shoot the blooms against a blue sky to energize the color field.

Go for the Grand View

My wildflower high is finding a luscious patch to incorporate into a wide-view landscape. Usually the more depth a picture shows, the more appealing it is. I try to bring six distinct planes into the picture field—the wildflower foreground, a mid-ground (ideally also wildflowers), then a compelling background, horizon, clouds, and blue sky. Finding the best position is trial-and-error; remove the camera from the tripod to test various angles.

My concern is capturing the foreground flowers at their best—nicely lit and close enough to show detail, while not compromising the other planes.

Shoot the Breeze

Wind is the bane of nature photographers. Wildflowers sway and flutter, making it impossible to get a sharp picture. At close range only a brief exposure can arrest this, and it may freeze the blooms in awkward positions, and prevent the use of a small

Heed Nature's Calls

The best way to optimize your wildflower photography is to adapt your shooting to natural conditions, namely weather and time of day. You will have the most enjoyable and productive results if you don't fight Mother Nature. Some recommendations:

WEATHER	TIME OF DAY	BEST SUBJECT/APPROACH
Overcast skies	All day	Portraits, ultra close-ups, bouquets, and patches
Windy/breezy	Any time	Long-exposure, blurred-motion studies
Sun with/without clouds	Low sun	Small-aperture, full-depth landscapes
Sun with clouds	Midday	Full-aperture telephoto portraits with reflector
Sun without clouds	Midday	Wide-angle, back-lit, ultra close-ups with reflector

aperture needed for depth of field.

In times like these I go with the blow, capturing wind-blurred blossoms using a slow shutter speed. The exposure time depends on how windy it is and how close you are to the flowers; your DSLR's picture review allows you to experiment. The blur should look intentional: Don't settle for fuzzy. Go all the way to creamy. The effect will be twice as captivating if you bring a few elements into the scene that don't move. This technique works best with light-colored flowers—white, lavender, yellow, pink, and orange—which generate blurs of pure color. Darker hues blend in with green foliage and can look indistinct.

Get All the Details

Getting everything in sharp focus is often desirable whether photographing flower fields or single blossoms. The usual approach is to maximize depth of field by shooting at a small aperture. But this causes a decline in resolution due to diffraction and requires increased exposure time. A tilt/shift lens lets you tilt the focal plane to match the subject; with it, you can use wider apertures and still keep important elements in focus. But these lenses are very expensive, offered by only a few camera makers, and require careful adjustment.

In postprocessing, you can use special software (such as Helicon Focus, www.heliconsoft.com) to combine a series of refocused shots into one fully sharp image. You need to make identically framed captures at the same aperture, and refocus to move the depth-of-field zone in progressive overlapping steps. Conditions must be dead calm, and lighting stable, otherwise the software will be unable to assemble the resulting series.

Tim Fitzharris has been photographing the natural world for more than 30 years. His latest book is the National Audubon Society Guide to Landscape Photography *(second edition). Visit timfitzharris.com.*

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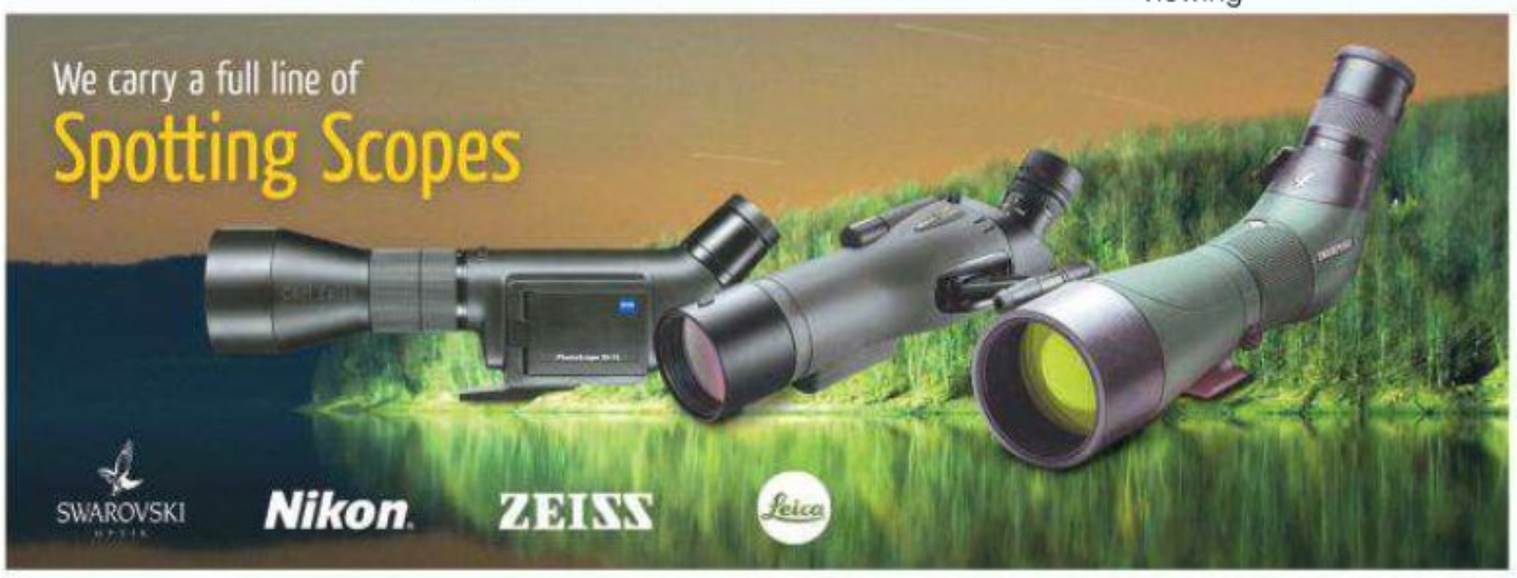

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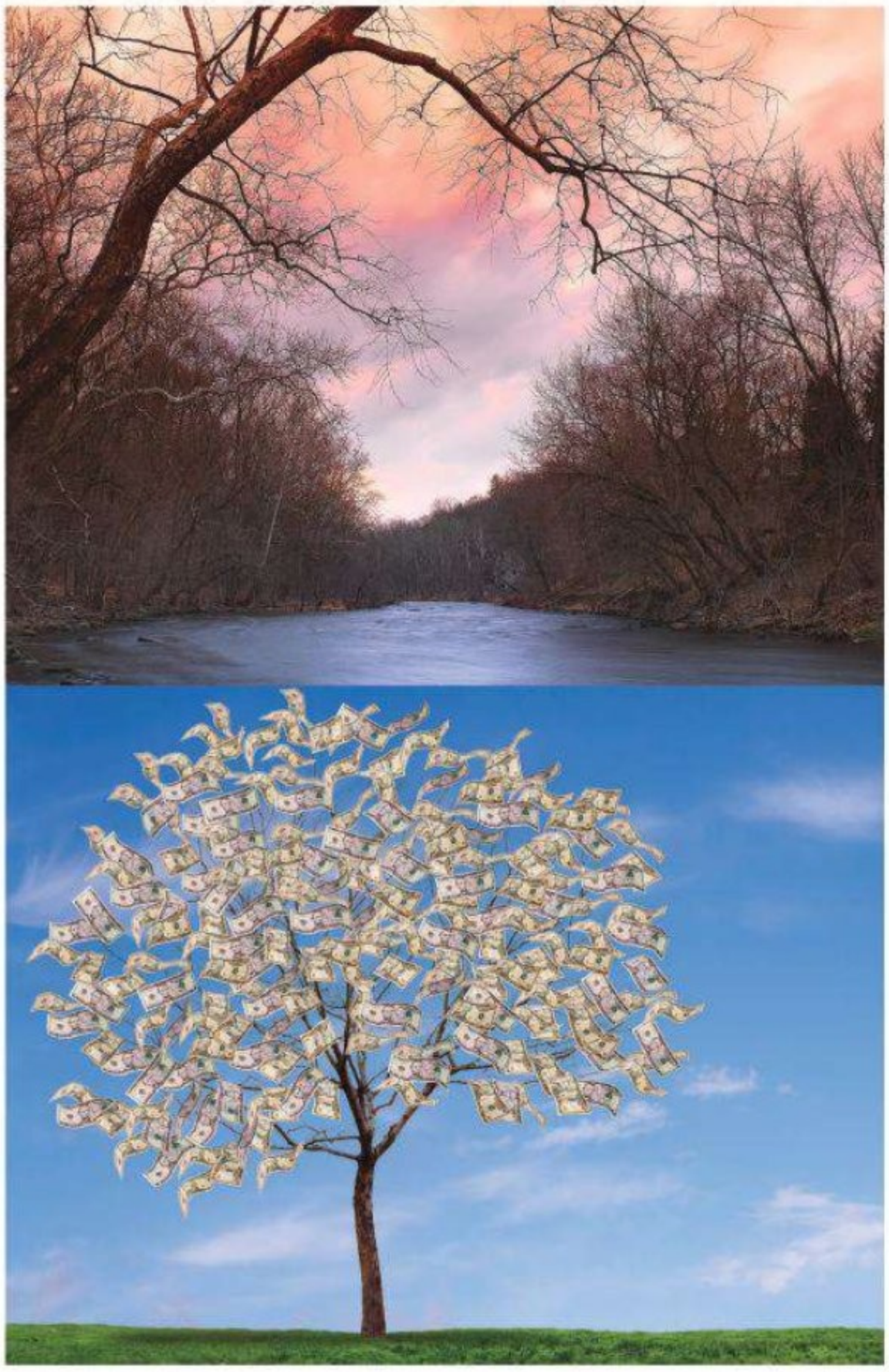

DEREK JECXZ (RIVER); JENN HULS/SHUTTERSTOCK.COM (MONEY TREE)

GALLERY BOUND
If you want to sell your prints, Derek Jecxz points out that it will take lots of dedication and persistance. And beautiful pictures, like this one made in Point Pleasant, PA.

HIGH CONCEPT
Jenn Huls loves shooting stock because she is free to create what she likes and can work according to her own schedule. The image at left is a composite of 15 to 20 different photos.

Shoot Sports

Photographing your team from the bleachers isn't much fun, so why not combine your passions for sports and photography? Pennyslvania-based Den Sweeney (densweeneyphotography.com) and partner Ho Chuen Kan (a.k.a. J-Kan) get hired by universities, high-school programs, and parent groups to shoot games as well as athletic portraits. In addition to showcasing your work using social media, Sweeney suggests that photographers shoot for fun to improve. But, adds the former hockey player, coach, and recruiter, "know the sport that you're photographing."

And don't forget about the video setting on your DSLR. Lion Creative Group (lioncreativegroup.com), headed up by Matthew Leone, recently added high school sports recruitment videos to its services. As Leone explains, there are many top-notch athletes vying for the attention of scouts and college coaches, but "college program budgets are getting slashed, so the best way to get noticed is a top-quality video."

For those new to the field, Leone suggests approaching the "athletic directors and high school coaches of top programs; those are the ones that sniff out talent. The athletes trust their coaches and ADs. Get a coach and an AD to trust your service and they will help you multiple times."

If extreme sports are your thing, check out Chris Garrison's work (chrisgarrisonphotography.com).

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Garrison, who shoots wakeboarding and snowboarding, knows both sports well and, equally important, knows the athletes. He started by shooting for magazines part-time, submitting images to various publications, and last year he was able to make the switch to shooting full-time. "I think of editorial as paid advertising for my work, because that's how the manufacturers [of extreme sports gear] find you."

Sell Stock

While pros now depend less on stock, there are still plenty of opportunities for amateurs with companies such as Shutterstock, iStock Photo, and Getty's Flickr collection.

Scott Braut, VP of Content at Shutterstock, notes that the "images that sell best often express both concepts and literal subject matter. An image of a rock climber can be used to illustrate an article about extreme sports but also signifies business concepts."

He suggests that contributing photographers pay attention to "advertisements, the news, lifestyle trends, fashion trends, political and social issues." And, he says, upload images often. "The secret to a top-selling portfolio is to keep putting new work in front of customers."

Jennifer Huls (www.shutterstock.com/g/jhuls) joined Shutterstock in 2012, less than two years after she first started learning to use her camera. A mother of three, Huls says that being a parent "takes up most of my time, but it is nice to have a part-time job that I can do from home."

She submits 20 to 25 images a week to Shutterstock, about 90 percent of which are shot in her basement studio. So far, Huls reports, "I have met all of my earnings goals and hope that this year is as good as the last." Her advice? "Shoot what you are passionate about and don't worry about what will sell. Some will sell and some won't, but at least you won't get bored with it."

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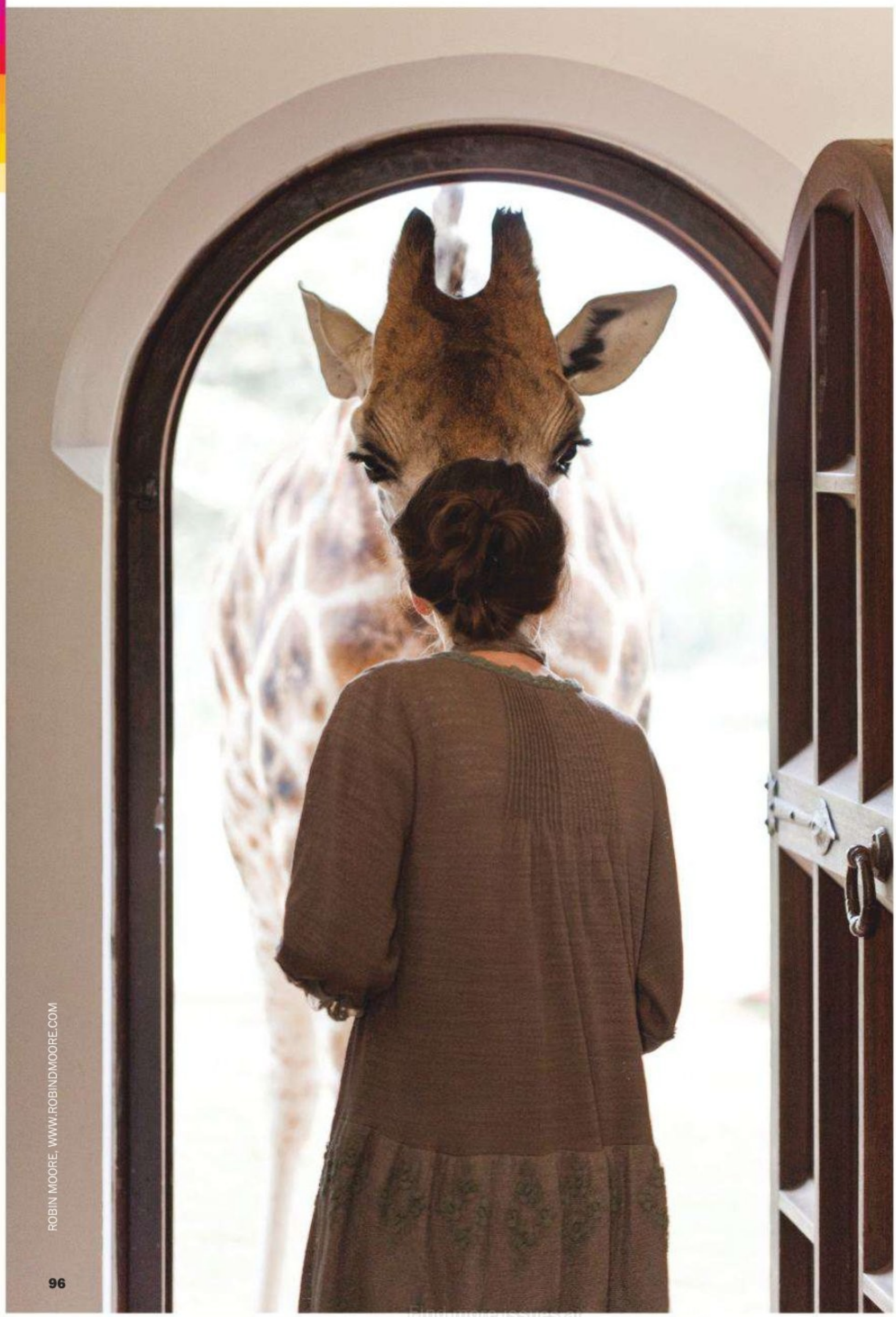
Animal House

Robin Moore's view from a Kenyan giraffe sanctuary



ROBIN MOORE, WWW.ROBINDMOORE.COM

I FIRST FOUND out about Giraffe Manor in 2009. Built in Kenya in 1932, its grounds were one of the last strongholds for the endangered Roths-child giraffe—it now operates as a breeding center, enabling giraffes to be reintroduced into areas where they had disappeared.

Owners Tanya and Mikey Carr-Hartley invited me to photo-graph for them on a few trips, starting in the summer of 2010. It is one of the most unusual places I have ever worked. Sitting down for breakfast with a giraffe craning through a window is surreal. Separated by a wall, these are gentle giants, but roaming among them, watch out! I got chased around a tree, and once only narrowly avoided being headbutted.

This woman is one of the managers. The giraffe approached as she opened the front door, and I had to move quickly behind her. Conservation is about learning to coexist with the natural world, so it was incredible to cap-ture such an intimate encounter between an endangered animal and people. ***—As told to Lori Fredrickson***

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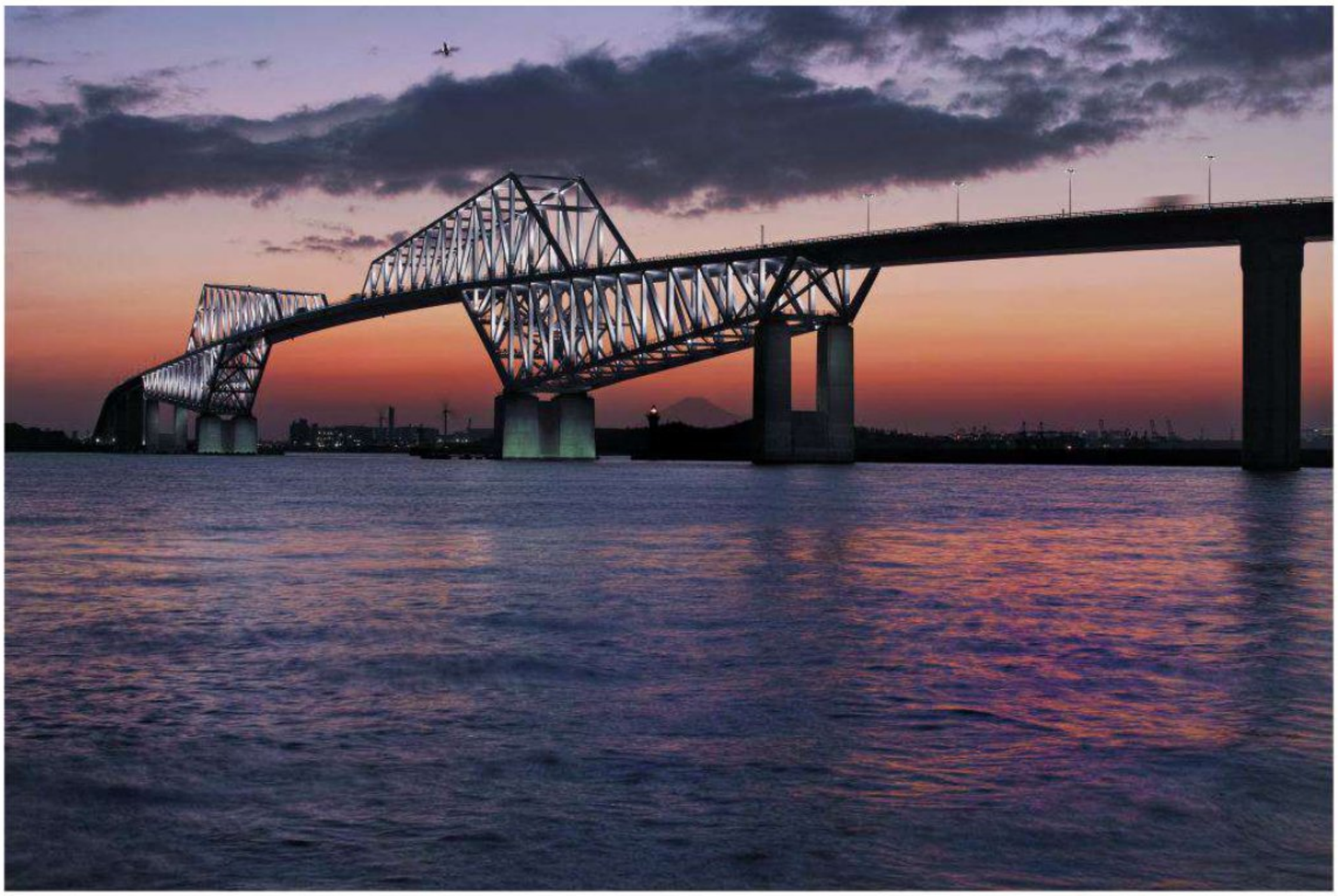

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